EXHIBIT G

Exhibit A-25
Invalidity Claim Chart for U.S. Patent No. 7,924,802 vs. U.S. Patent No. 8,416,879

U.S. Patent No. 8,416,879 ("Rofougaran") was filed on March 15, 2006, published on June 7, 2007 (U.S. Patent Application No. 2007/0127590), and issued on April 9, 2013. Rofougaran anticipates asserted claims 1–4, 6–10, 13, 14, 17, and 21–24 of U.S. Patent No. 7,924,802 ("the '802 Patent") under 35 U.S.C. § 102. Rofougaran also renders obvious asserted claims 1–4, 6–10, 13, 14, 17, and 21–24 of the '802 Patent under 35 U.S.C. § 103, alone based on the state of the art and/or in combination with one or more other references identified in Exs. A-1–A-31, Cover Pleading, and First Supplemental Ex. A-Obviousness Chart.[1]

To the extent Plaintiff alleges that Rofougaran does not disclose any particular limitation of the asserted claims in the '802 Patent, either expressly or inherently, it would have been obvious to a person of ordinary skill in the art as of the priority date of the '802 Patent to modify Rofougaran and/or to combine the teachings of Rofougaran with other prior art references, including but not limited to the present prior art references found in Exs. A-1–A-31, Cover Pleading, First Supplemental Ex. A-Obviousness Chart, and the relevant section of charts for other prior art for the '802 Patent in a manner that would render the asserted claims of these patents invalid as obvious.

With respect to the obviousness of the asserted claims of the '802 Patent under 35 U.S.C. § 103, one or more of the principles enumerated by the United States Supreme Court in *KSR v. Teleflex*, 550 U.S. 398 (2007) apply, including: (a) combining various claimed elements known in the prior art according to known methods to yield a predictable result; and/or (b) making a simple substitution of one or more known elements for another to obtain a predictable result; and/or (c) using a known technique to improve a similar device or method in the same way; and/or (d) applying a known technique to a known device or method ready for improvement to yield a predictable result; and/or (e) choosing from a finite number of identified, predictable solutions with a reasonable expectation of success or, in other words, the solution was one which was "obvious to try"; and/or (f) a known work in one field of endeavor prompting variations of it for use either in the same field or a different field based on given design incentives or other market forces in which the variations were predictable to one of ordinary skill in the art; and/or (g) a teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill in the art to modify the prior art reference or to combine the

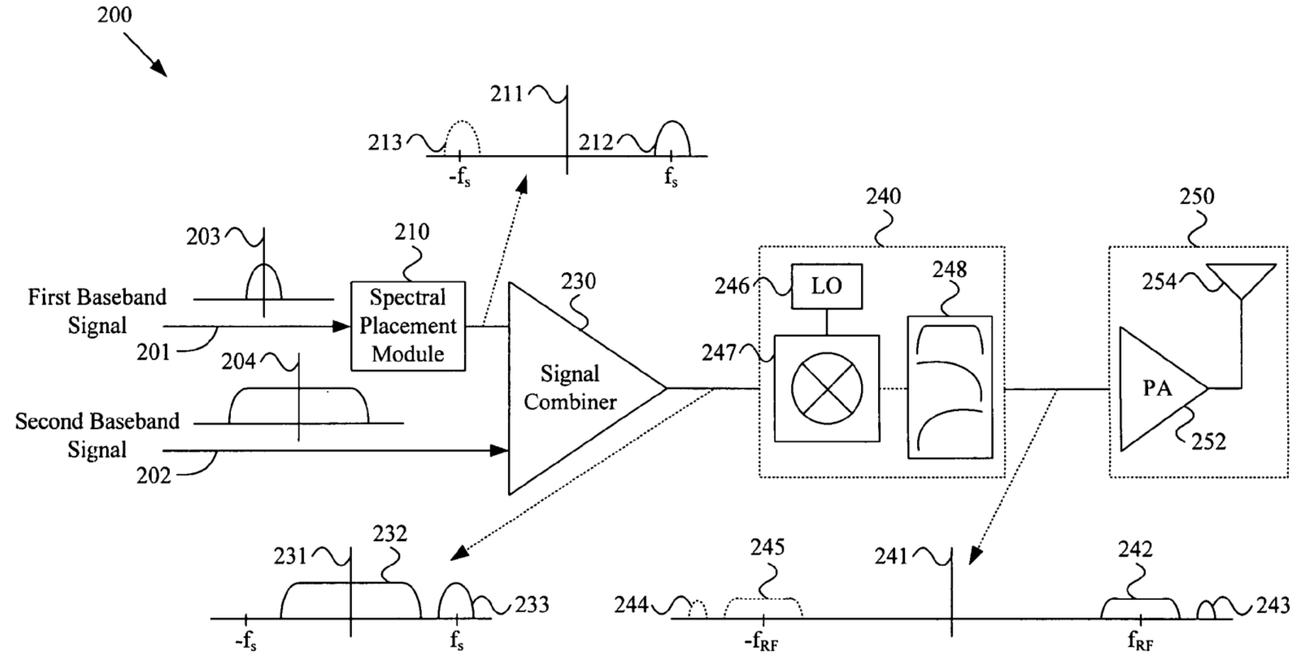
[1] Samsung is investigating this prior art and has not yet completed discovery from third parties, who may have relevant information concerning the prior art, and therefore, Samsung reserves the right to supplement this chart after additional discovery is received. To the extent that any of the prior art discloses the same or similar functionality or feature(s) of any of the accused products, Samsung reserves the right to argue that said feature or functionality does not practice any limitation of any of the asserted claims, and to argue, in the alternative, that if said feature or functionality is found to practice any limitation of any of the asserted claims in the '802 Patent, then the prior art reference teaches the limitation and that the claim is not patentable.

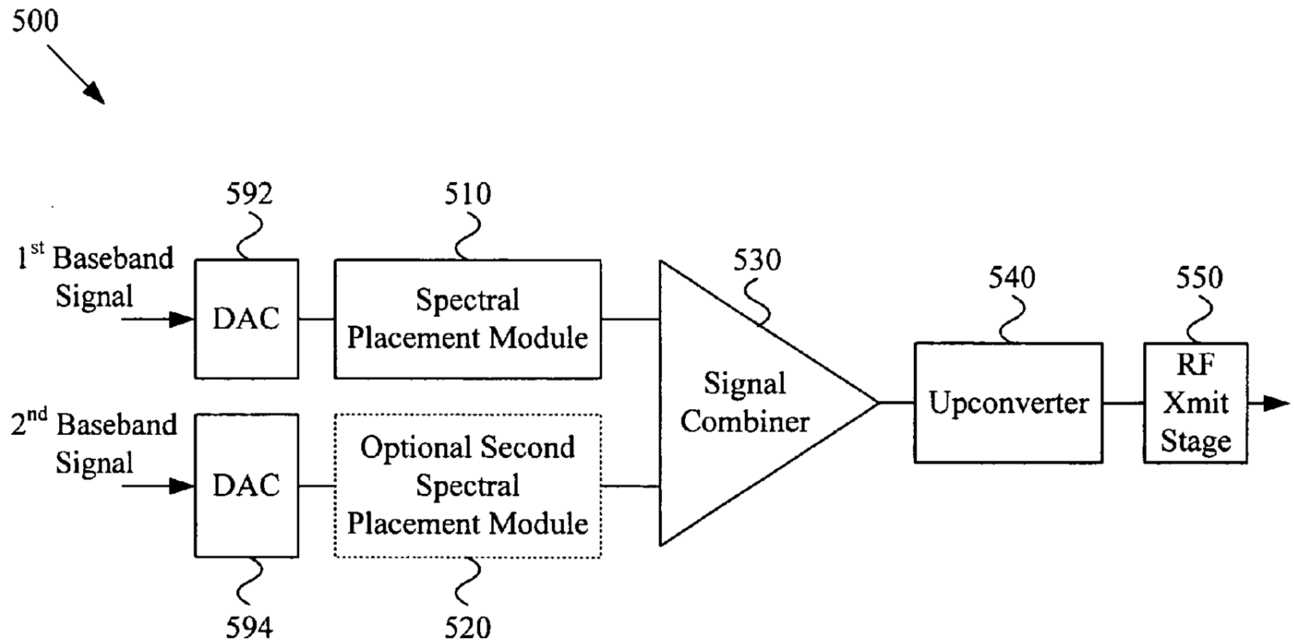
teachings of various prior art references to arrive at the claimed invention. It therefore would have been obvious to one of ordinary skill in the art to combine the disclosures of these references in accordance with the principles and rationales set forth above.

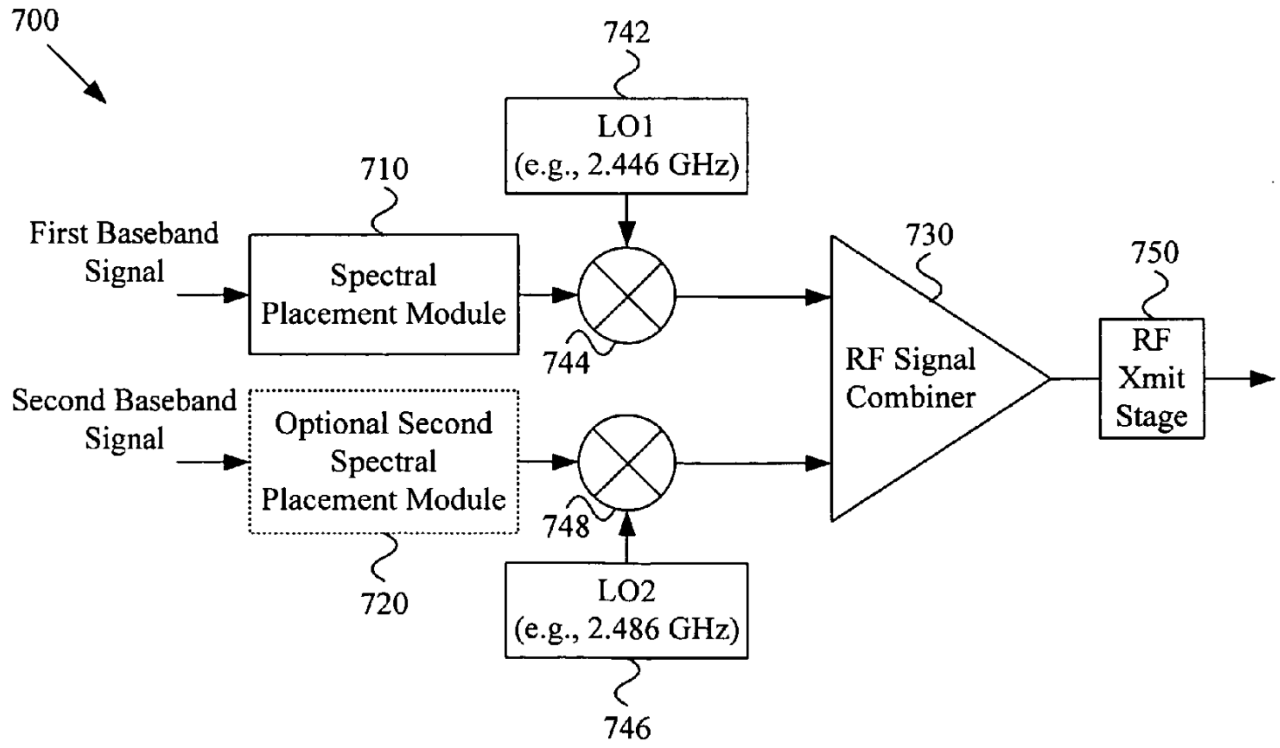
The citations to portions of any reference in this chart are exemplary only. For example, a citation that refers to or discusses a figure or figure item should be understood to also incorporate by reference that figure and any additional descriptions of that figure as if set forth fully therein. Samsung reserves the right to rely on the entirety of the references cited in this chart to show that the asserted claims of the '802 Patent are invalid. Citations presented for one claim limitation are expressly incorporated by reference into all other limitations for that claim as well as all limitations of all claims on which that claim depends. Samsung also reserves the right to rely on additional citations or sources of evidence that also may be applicable, or that may become applicable in light of claim construction, changes in Plaintiff's infringement contentions, and/or information obtained during discovery as the case progresses.

Claim 1 of the '802 Patent	**Prior Art Reference – Rofougaran**
[1.1] A method of transmitting information in a wireless communication channel comprising:	To the extent the preamble is limiting, Rofougaran discloses "A method of transmitting information in a wireless communication channel comprising." See, e.g.: FIG. 1 is a diagram showing a portion of a first non-limiting exemplary communication system 100, in accordance with various aspects of the present invention. The communication system (or device) may comprise characteristics of any of a variety of communication systems/devices (e.g., multimode wireless communication devices). For example and without limitation, the communication system may comprise characteristics of any of a variety of mobile wireless communication devices (e.g., cellular phones, paging devices, portable email devices, etc.). Also for example, the communication system may comprise characteristics of fixed communication systems or devices (e.g., network access points, base stations, satellites, wireless routers, set top boxes, etc.). Further for example, the communication system may comprise characteristics of a variety of electronic devices with wireless communication capability (e.g., televisions, music players, cameras, remote controls, personal digital assistants, handheld computers, gaming devices, etc.). Accordingly, the scope of various aspects of the present invention should not be limited by characteristics of particular communication systems or devices. The following discussion will, at times, refer to various communication modes. A multimode communication device may, for example, be adapted to communicate in a plurality of such

Claim 1 of the '802 Patent	Prior Art Reference – Rofougaran
	communication modes. For the following discussion, a communication mode may generally be considered to coincide with communication utilizing a particular communication protocol or standard. A non-limiting list of exemplary communication protocols includes various cellular communication protocols (e.g., GSM, GPRS, EDGE, CDMA, WCDMA, TDMA, PDC, etc.), various wireless networking protocols or standards, including WLAN, WMAN, WPAN and WWAN (e.g., IEEE 802.11, Bluetooth, IEEE 802.15, UWB, IEEE 802.16, IEEE 802.20, Zigbee, any WiFi protocol, etc.), various television communication standards, etc. The scope of various aspects of the present invention should not be limited by characteristics of particular communication modes or protocols, whether standard or proprietary. *See, e.g.*, Rofougaran at 2:36-3:6. Furthermore, this claim element is obvious in light of Rofougaran itself, when combined with any of the other references as charted for this claim element in Exs. A-1–A-31, First Supplemental Ex. A-Obviousness Chart, and/or when combined with the knowledge of one of ordinary skill in the art. Motivations to combine may come from the knowledge of the person of ordinary skill themselves, or from the known problems and predictable solutions as embodied in these references. Further motivations to combine references and additional details may be found in the Cover Pleading and First Supplemental Ex. A-Obviousness Chart.
[1.2] transmitting first information across a first frequency range using a wireless transmitter, the first frequency range having a first center frequency, a first highest frequency, and a first lowest frequency; and	Rofougaran discloses "transmitting first information across a first frequency range using a wireless transmitter, the first frequency range having a first center frequency, a first highest frequency, and a first lowest frequency." See, e.g.:

Claim 1 of the '802 Patent	Prior Art Reference – Rofougaran
	 Figure 2 *See, e.g.*, Rofougaran at Figure 2.

Claim 1 of the '802 Patent	Prior Art Reference – Rofougaran
	 Figure 5 *See, e.g.*, Rofougaran at Figure 5.

Claim 1 of the '802 Patent	Prior Art Reference – Rofougaran
	 Figure 7 *See, e.g.*, Rofougaran at Figure 7. FIG. 1 is a diagram showing a portion of a first non-limiting exemplary communication system 100, in accordance with various aspects of the present invention. The communication system (or device) may comprise characteristics of any of a variety of communication systems/devices (e.g., multimode wireless communication devices). For example and without limitation, the communication system may comprise characteristics of any of a variety of mobile wireless communication devices (e.g.,

Claim 1 of the ’802 Patent	**Prior Art Reference – Rofougaran**
	cellular phones, paging devices, portable email devices, etc.). Also for example, the communication system may comprise characteristics of fixed communication systems or devices (e.g., network access points, base stations, satellites, wireless routers, set top boxes, etc.). Further for example, the communication system may comprise characteristics of a variety of electronic devices with wireless communication capability (e.g., televisions, music players, cameras, remote controls, personal digital assistants, handheld computers, gaming devices, etc.). Accordingly, the scope of various aspects of the present invention should not be limited by characteristics of particular communication systems or devices. The following discussion will, at times, refer to various communication modes. A multimode communication device may, for example, be adapted to communicate in a plurality of such communication modes. For the following discussion, a communication mode may generally be considered to coincide with communication utilizing a particular communication protocol or standard. A non-limiting list of exemplary communication protocols includes various cellular communication protocols (e.g., GSM, GPRS, EDGE, CDMA, WCDMA, TDMA, PDC, etc.), various wireless networking protocols or standards, including WLAN, WMAN, WPAN and WWAN (e.g., IEEE 802.11, Bluetooth, IEEE 802.15, UWB, IEEE 802.16, IEEE 802.20, Zigbee, any WiFi protocol, etc.), various television communication standards, etc. The scope of various aspects of the present invention should not be limited by characteristics of particular communication modes or protocols, whether standard or proprietary. The exemplary communication system 100 may comprise at least a first input 101 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to any of the previously mentioned communication protocols. The exemplary communication system 100 may also comprise at least a second input 102 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first

Claim 1 of the '802 Patent	Prior Art Reference – Rofougaran
	communication protocol discussed above). For example and without limitation, the second baseband signal may correspond to any of the previously mentioned communication protocols. The first baseband signal and the second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of the communication system 100. For example, such modules may generate the first and second baseband signals independently (e.g., corresponding to independent respective communications). Alternatively, for example, such modules may generate the first and second baseband signals in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first and second baseband signals for a single communication). The exemplary communication system 100 may additionally comprise a spectral placement module 110 that is adapted to spectrally shift the first baseband signal (i.e., shift the frequency spectrum of the first baseband signal). In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to spectrally shift the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with the second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to implement a frequency-hopping scheme with the first baseband signal. For example, in a scenario, where there are one or more frequency bands (e.g., a second frequency space) associated with the second baseband signal, the spectral placement module 110 may be adapted to shift the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. *See, e.g.*, Rofougaran at 2:38-3:58. The exemplary communication system 100 may also comprise a second spectral placement module 120. Such a second spectral placement module 120 may, for example, share any or all characteristics

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	with the spectral placement module 110 discussed previously. The incorporation of such a second spectral placement module 120 may, for example, provide spectral shifting flexibility. For example, in such an exemplary configuration, either or both of the first and second baseband signals may be spectrally shifted to substantially distinct frequency spaces. Also for example, in such an exemplary configuration, either or both of the first and second baseband signals may be frequency hopped. Note that though the second spectral placement module 120 is illustrated separate from the first spectral placement module 110, the second spectral placement module 120 may share any or all hardware and/or software components with the spectral placement module 110. The exemplary communication system 100 may further comprise a signal combiner 130 that is adapted to generate a composite signal comprising various input signals to the signal combiner 130. For example, the composite signal may simultaneously (i.e., at an instant in time) comprise components associated with various input signals. Note that such simultaneity need not always be present. For example, at a first instant in time, the signal output from the signal combiner 130 might comprise a plurality of components associated with a plurality of respective input signals, at a second instant in time, the signal output from the signal combiner 130 might comprise a single component associated with a single respective input signal, and at a third instant in time, the signal output from the signal combiner 130 might comprise no components. In a first non-limiting exemplary scenario, the signal combiner 130 may receive a first signal that is based on the first baseband signal (e.g., associated with a first communication protocol). Also, the signal combiner 130 may receive a second signal that is based on the second baseband signal (e.g., associated with a second communication protocol). In such a scenario, the signal combiner 130 may combine the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the first baseband signal and a second signal component based on the second baseband signal. In such a scenario, for example where the frequency spectra of the first and second baseband signals do not overlap, the first and second baseband signals might not be spectrally shifted prior to combining by the signal combiner 130. In such a scenario, the spectral placement module 110 (and optionally, the second spectral placement module 120) may receive a control signal indicating whether or not to perform spectral shifting and/or to what degree spectral shifting should be implemented.

Claim 1 of the '802 Patent	Prior Art Reference – Rofougaran
	See, e.g., Rofougaran at 4:16-67. Various components of the exemplary communication system 100 (and other communication systems illustrated and discussed herein) may be implemented in analog and/or digital circuitry. To illustrate this, the exemplary communication system 100 is not shown with analog-to-digital converters (ADCs) or digital-to-analog converters (DACs). FIGS. 4-6, to be discussed later, show various non-limiting exemplary configurations including such converters. FIG. 2 is a diagram showing a portion of a second non-limiting exemplary communication system 200, in accordance with various aspects of the present invention. The communication system 200 may, for example and without limitation, share any or all characteristics with the communication system 100 illustrated in FIG. 1 and discussed previously. The exemplary communication system 200 may comprise at least a first input 201 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to the Bluetooth communication protocol. FIG. 2 shows an exemplary frequency spectrum 203 associated with the first baseband signal. The exemplary communication system 200 may also comprise at least a second input 202 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first communication protocol discussed above). For example and without limitation, the first baseband signal may correspond to an IEEE 802.11 communication protocol (e.g., IEEE 802.11(b) or IEEE 802.11(g)). FIG. 2 shows an exemplary frequency spectrum 204 associated with the second baseband signal. *See, e.g.*, Rofougaran at 5:64-6:31.

Claim 1 of the '802 Patent	Prior Art Reference – Rofougaran
	In a non-limiting exemplary configuration illustrated in FIG. 2, the signal combiner 230 receives a first signal from the spectral placement module 210 that is based on the spectrally shifted first baseband signal. Also, the signal combiner 230 receives a second signal that is based on the second baseband signal. In such a configuration, the signal combiner 230 combines the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the spectrally shifted first baseband signal and a second signal component based on the second baseband signal (e.g., not spectrally shifted). FIG. 2 shows an exemplary frequency spectrum 231 associated with the composite signal formed by the signal combiner 230. The spectrum 231 comprises a first portion 233 corresponding to the first signal component, and a second portion 232 corresponding to the second signal component. Note that the first portion 233 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 232. The exemplary communication system 200 may also comprise an upconverter 240 adapted to upconvert a signal (e.g., the composite signal from the signal combiner 230) for transmission. The upconverter 240 may, for example and without limitation, share any or all characteristics with the upconverter 140 discussed previously. The upconverter 240 may, for example, comprise a mixer 247, a local oscillator 246 and one or more filters 248. The mixer 247 may, for example, receive the composite signal from the signal combiner 230 and an RF mixing signal at frequency fRF from a local oscillator 246. The upconverter 240 may, for example, filter the upconverted signal from the mixer 247 with one or more filters 248. The output of the upconverter 240 may, for example, comprise a signal indicative of the composite signal spectrally shifted to an RF frequency. FIG. 2 shows an exemplary frequency spectrum 241 associated with the RF signal formed by the upconverter 240. The frequency spectrum 241 comprises a first portion 243 corresponding to the first signal component and a second portion 242 corresponding to the second signal component. Note that the first portion 243 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 242. Also note that the first portion 243 and

Claim 1 of the '802 Patent	Prior Art Reference – Rofougaran
	second portion 242 might be formed with a first mirror portion 244 and second mirror portion 245, respectively. Note that a mirror portion may either be removed or may be kept for later processing. The exemplary communication system 200 may further comprise a RF transmission stage 250 adapted to transmit an RF signal. The RF transmission stage 250 may, for example and without limitation, share any or all characteristics with the RF transmission stage 150 discussed previously. Such an RF signal may, for example, be associated with the composite signal output from the signal combiner 230 and upconverted by the upconverter 240. The RF transmission stage 250 may, for example and without limitation, comprise a power amplifier 252, antenna 254 and other components generally associated with RF signal transmission. *See, e.g.*, Rofougaran at 6:66-7:57. For example, the spectral placement module 510, optional second spectral placement module 520 and signal combiner 530 may operate in the analog domain. The first digital-to-analog converter 592 may convert the first baseband signal to the analog domain for processing by the spectral placement module 510. The second digital-to-analog converter 594 may convert the second baseband signal to the analog domain for processing by the second spectral placement module 520 or signal combiner 530. The signal combiner 530 then combines signals in the analog domain to generate an analog composite signal, which is then upconverted and transmitted by the upconverter 540 and RF transmission stage 550, respectively. *See, e.g.*, Rofougaran at 9:30-41. FIG. 7 is a diagram showing a portion of a seventh non-limiting exemplary communication system 700, in accordance with various aspects of the present invention. The exemplary communication system 700 may, for example and without limitation, share any or all characteristics with the exemplary systems 100-600 illustrated in FIGS. 1-6 and discussed previously. The exemplary communication system 700 may comprise a first mixer 744 that receives a spectrally shifted first baseband signal from the spectral placement module 710 and a first RF mixing signal (e.g., a 2.446 GHz signal generally associated with the Bluetooth communication protocol) from a

Claim 1 of the '802 Patent	Prior Art Reference – Rofougaran
	first local oscillator 742. The exemplary communication system 700 may also comprise a second mixer 748 that receives a second baseband signal (or a spectrally shifted second baseband signal) and a second RF mixing signal (e.g., a 2.486 GHz signal generally associated with the IEEE 802.11(g) communication protocol) from a second local oscillator 746. The exemplary communication system 700 may comprise an RF signal combiner 730 that is adapted to combine input RF signals. The RF signal combiner 730 may, for example, receive and combine the output signals from the first mixer 744 and second mixer 748 to generate an RF composite signal. The exemplary communication system 700 may also comprise a RF transmission stage 750 that receives the RF composite signal from the RF signal combiner 730 and transmit the signal. *See, e.g.*, Rofougaran at 10:18-43. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 810 comprises receiving the first baseband signal, step 810 may comprise receiving the first baseband signal in any manner generally associated with receiving a baseband signal. The first baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 810 may, for example, comprise generating the first baseband signal independently (e.g., corresponding to an independent communication). Step 810 may alternatively, for example, comprise generating the first baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first baseband signal and other baseband signals for a single communication). The exemplary method 800 may, at step 820, comprise spectrally placing (or shifting) the first baseband signal (e.g., received at step 810). Step 820 may, for example and without limitation, share any or all functional characteristics with the spectral placement modules 110-710 of the exemplary systems 100-700 illustrated in FIGS. 1-7 and discussed previously.

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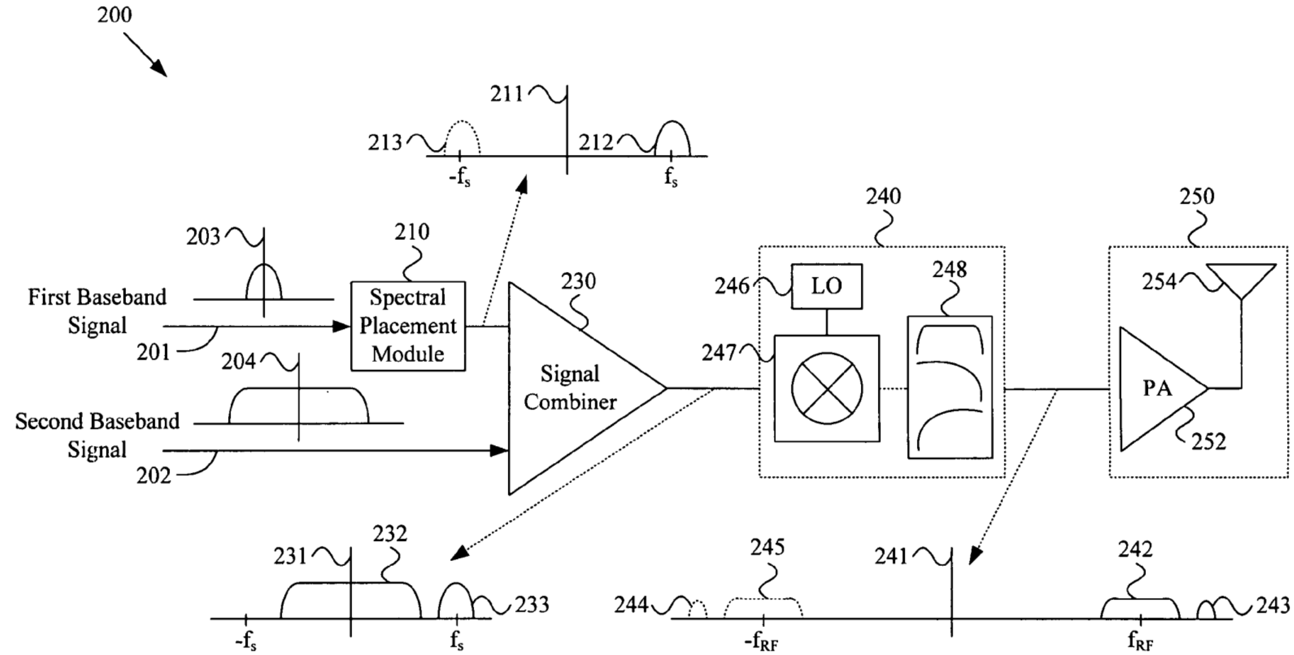
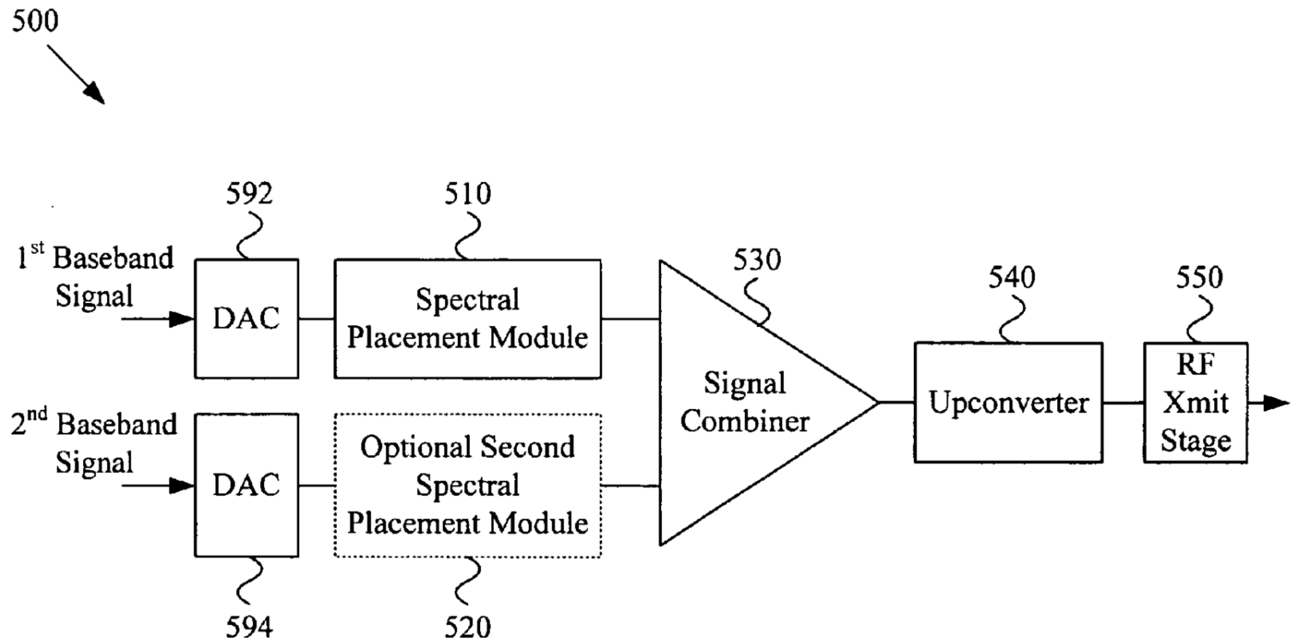
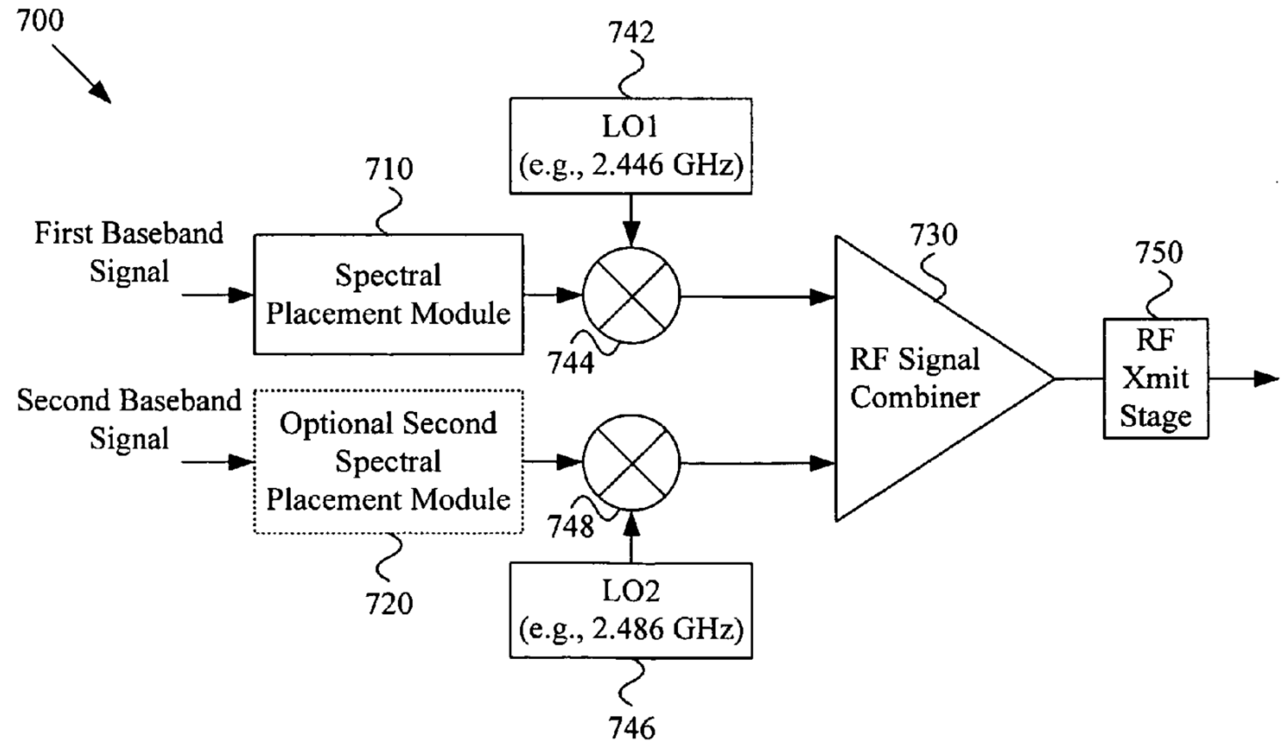
	Step 820 may, for example, comprise spectrally shifting the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with a second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, step 820 may comprise implementing a frequency-hopping scheme with the first baseband signal. For example, in a scenario where there are one or more frequency bands (e.g., a second frequency space) associated with a second baseband signal, step 820 may comprise spectrally shifting the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. In another non-limiting exemplary scenario, spectrally shifting the first baseband signal may result in the production of a spectral image (e.g., frequency content mirrored about a mixing frequency utilized to spectrally shift the first baseband signal). In such a scenario, step 820 may comprise accepting or rejecting the image. In a scenario where an image is rejected, step 820 may comprise rejecting the image in any of a variety of manners. For example and without limitation, step 820 may comprise performing image reject mixing to spectrally shift the first baseband signal. Such image reject mixing generally comprises spectrally shifting a signal and rejecting an image associated with the spectrally shifted signal. Also for example, step 820 may comprise filtering out an unwanted image. The scope of various aspects of the present invention should not be limited by the utilization of image rejection or by any particular manner of performing such image rejection. The exemplary method 800 may, at step 830, comprise generating and/or receiving a second baseband signal corresponding to a second communication protocol (e.g., different from the first communication protocol). Step 830 may, for example and without limitation, share any or all functional characteristics with the second input 102 of the exemplary system 100 illustrated in FIG. 1 and discussed previously.

Claim 1 of the '802 Patent	Prior Art Reference – Rofougaran
	The second baseband signal may, for example, correspond to a second communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 830 comprises receiving the second baseband signal, step 830 may comprise receiving the second baseband signal in any manner generally associated with receiving a baseband signal. The second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 830 may, for example, comprise generating the second baseband signal independently (e.g., corresponding to a communication independent of a communication associated with the first baseband signal). Step 830 may alternatively, for example, comprise generating the second baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the second baseband signal and the first baseband signal for a single communication). *See, e.g.*, Rofougaran at 11:53-13:4. Furthermore, this claim element is obvious in light of Rofougaran itself, when combined with any of the other references as charted for this claim element in Exs. A-1–A-31, First Supplemental Ex. A-Obviousness Chart, and/or when combined with the knowledge of one of ordinary skill in the art. Motivations to combine may come from the knowledge of the person of ordinary skill themselves, or from the known problems and predictable solutions as embodied in these references. Further motivations to combine references and additional details may be found in the Cover Pleading and First Supplemental Ex. A-Obviousness Chart.
[1.3] simultaneously transmitting second information across a second frequency range using the same wireless transmitter, the second frequency range having a second center frequency greater than the	Rofougaran discloses "simultaneously transmitting second information across a second frequency range using the same wireless transmitter, the second frequency range having a second center frequency greater than the first center frequency, a second highest frequency, and a second lowest frequency." See, e.g.:

Claim 1 of the '802 Patent	Prior Art Reference – Rofougaran
first center frequency, a second highest frequency, and a second lowest frequency.	 Figure 2 *See, e.g.*, Rofougaran at Figure 2.

Claim 1 of the '802 Patent	**Prior Art Reference – Rofougaran**
	 Figure 5 *See, e.g.*, Rofougaran at Figure 5.

Claim 1 of the '802 Patent	Prior Art Reference – Rofougaran
	 Figure 7 *See, e.g.*, Rofougaran at Figure 7. FIG. 1 is a diagram showing a portion of a first non-limiting exemplary communication system 100, in accordance with various aspects of the present invention. The communication system (or device) may comprise characteristics of any of a variety of communication systems/devices (e.g., multimode wireless communication devices). For example and without limitation, the communication system may comprise characteristics of any of a variety of mobile wireless communication devices (e.g.,

Claim 1 of the ’802 Patent	Prior Art Reference – Rofougaran
	cellular phones, paging devices, portable email devices, etc.). Also for example, the communication system may comprise characteristics of fixed communication systems or devices (e.g., network access points, base stations, satellites, wireless routers, set top boxes, etc.). Further for example, the communication system may comprise characteristics of a variety of electronic devices with wireless communication capability (e.g., televisions, music players, cameras, remote controls, personal digital assistants, handheld computers, gaming devices, etc.). Accordingly, the scope of various aspects of the present invention should not be limited by characteristics of particular communication systems or devices. The following discussion will, at times, refer to various communication modes. A multimode communication device may, for example, be adapted to communicate in a plurality of such communication modes. For the following discussion, a communication mode may generally be considered to coincide with communication utilizing a particular communication protocol or standard. A non-limiting list of exemplary communication protocols includes various cellular communication protocols (e.g., GSM, GPRS, EDGE, CDMA, WCDMA, TDMA, PDC, etc.), various wireless networking protocols or standards, including WLAN, WMAN, WPAN and WWAN (e.g., IEEE 802.11, Bluetooth, IEEE 802.15, UWB, IEEE 802.16, IEEE 802.20, Zigbee, any WiFi protocol, etc.), various television communication standards, etc. The scope of various aspects of the present invention should not be limited by characteristics of particular communication modes or protocols, whether standard or proprietary. The exemplary communication system 100 may comprise at least a first input 101 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to any of the previously mentioned communication protocols. The exemplary communication system 100 may also comprise at least a second input 102 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first

Claim 1 of the ’802 Patent	Prior Art Reference – Rofougaran
	communication protocol discussed above). For example and without limitation, the second baseband signal may correspond to any of the previously mentioned communication protocols. The first baseband signal and the second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of the communication system 100. For example, such modules may generate the first and second baseband signals independently (e.g., corresponding to independent respective communications). Alternatively, for example, such modules may generate the first and second baseband signals in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first and second baseband signals for a single communication). The exemplary communication system 100 may additionally comprise a spectral placement module 110 that is adapted to spectrally shift the first baseband signal (i.e., shift the frequency spectrum of the first baseband signal). In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to spectrally shift the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with the second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to implement a frequency-hopping scheme with the first baseband signal. For example, in a scenario, where there are one or more frequency bands (e.g., a second frequency space) associated with the second baseband signal, the spectral placement module 110 may be adapted to shift the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. *See, e.g.*, Rofougaran at 2:38-3:58. The exemplary communication system 100 may also comprise a second spectral placement module 120. Such a second spectral placement module 120 may, for example, share any or all characteristics

Claim 1 of the '802 Patent	Prior Art Reference – Rofougaran
	with the spectral placement module 110 discussed previously. The incorporation of such a second spectral placement module 120 may, for example, provide spectral shifting flexibility. For example, in such an exemplary configuration, either or both of the first and second baseband signals may be spectrally shifted to substantially distinct frequency spaces. Also for example, in such an exemplary configuration, either or both of the first and second baseband signals may be frequency hopped. Note that though the second spectral placement module 120 is illustrated separate from the first spectral placement module 110, the second spectral placement module 120 may share any or all hardware and/or software components with the spectral placement module 110. The exemplary communication system 100 may further comprise a signal combiner 130 that is adapted to generate a composite signal comprising various input signals to the signal combiner 130. For example, the composite signal may simultaneously (i.e., at an instant in time) comprise components associated with various input signals. Note that such simultaneity need not always be present. For example, at a first instant in time, the signal output from the signal combiner 130 might comprise a plurality of components associated with a plurality of respective input signals, at a second instant in time, the signal output from the signal combiner 130 might comprise a single component associated with a single respective input signal, and at a third instant in time, the signal output from the signal combiner 130 might comprise no components. In a first non-limiting exemplary scenario, the signal combiner 130 may receive a first signal that is based on the first baseband signal (e.g., associated with a first communication protocol). Also, the signal combiner 130 may receive a second signal that is based on the second baseband signal (e.g., associated with a second communication protocol). In such a scenario, the signal combiner 130 may combine the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the first baseband signal and a second signal component based on the second baseband signal. In such a scenario, for example where the frequency spectra of the first and second baseband signals do not overlap, the first and second baseband signals might not be spectrally shifted prior to combining by the signal combiner 130. In such a scenario, the spectral placement module 110 (and optionally, the second spectral placement module 120) may receive a control signal indicating whether or not to perform spectral shifting and/or to what degree spectral shifting should be implemented.

Claim 1 of the ’802 Patent	**Prior Art Reference – Rofougaran**
	See, e.g., Rofougaran at 4:16-67. Various components of the exemplary communication system 100 (and other communication systems illustrated and discussed herein) may be implemented in analog and/or digital circuitry. To illustrate this, the exemplary communication system 100 is not shown with analog-to-digital converters (ADCs) or digital-to-analog converters (DACs). FIGS. 4-6, to be discussed later, show various non-limiting exemplary configurations including such converters. FIG. 2 is a diagram showing a portion of a second non-limiting exemplary communication system 200, in accordance with various aspects of the present invention. The communication system 200 may, for example and without limitation, share any or all characteristics with the communication system 100 illustrated in FIG. 1 and discussed previously. The exemplary communication system 200 may comprise at least a first input 201 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to the Bluetooth communication protocol. FIG. 2 shows an exemplary frequency spectrum 203 associated with the first baseband signal. The exemplary communication system 200 may also comprise at least a second input 202 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first communication protocol discussed above). For example and without limitation, the first baseband signal may correspond to an IEEE 802.11 communication protocol (e.g., IEEE 802.11(b) or IEEE 802.11(g)). FIG. 2 shows an exemplary frequency spectrum 204 associated with the second baseband signal. *See, e.g.*, Rofougaran at 5:64-6:31.

Claim 1 of the ’802 Patent	Prior Art Reference – Rofougaran
	In a non-limiting exemplary configuration illustrated in FIG. 2, the signal combiner 230 receives a first signal from the spectral placement module 210 that is based on the spectrally shifted first baseband signal. Also, the signal combiner 230 receives a second signal that is based on the second baseband signal. In such a configuration, the signal combiner 230 combines the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the spectrally shifted first baseband signal and a second signal component based on the second baseband signal (e.g., not spectrally shifted). FIG. 2 shows an exemplary frequency spectrum 231 associated with the composite signal formed by the signal combiner 230. The spectrum 231 comprises a first portion 233 corresponding to the first signal component, and a second portion 232 corresponding to the second signal component. Note that the first portion 233 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 232. The exemplary communication system 200 may also comprise an upconverter 240 adapted to upconvert a signal (e.g., the composite signal from the signal combiner 230) for transmission. The upconverter 240 may, for example and without limitation, share any or all characteristics with the upconverter 140 discussed previously. The upconverter 240 may, for example, comprise a mixer 247, a local oscillator 246 and one or more filters 248. The mixer 247 may, for example, receive the composite signal from the signal combiner 230 and an RF mixing signal at frequency fRF from a local oscillator 246. The upconverter 240 may, for example, filter the upconverted signal from the mixer 247 with one or more filters 248. The output of the upconverter 240 may, for example, comprise a signal indicative of the composite signal spectrally shifted to an RF frequency. FIG. 2 shows an exemplary frequency spectrum 241 associated with the RF signal formed by the upconverter 240. The frequency spectrum 241 comprises a first portion 243 corresponding to the first signal component and a second portion 242 corresponding to the second signal component. Note that the first portion 243 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 242. Also note that the first portion 243 and

Claim 1 of the ’802 Patent	**Prior Art Reference – Rofougaran**
	second portion 242 might be formed with a first mirror portion 244 and second mirror portion 245, respectively. Note that a mirror portion may either be removed or may be kept for later processing. The exemplary communication system 200 may further comprise a RF transmission stage 250 adapted to transmit an RF signal. The RF transmission stage 250 may, for example and without limitation, share any or all characteristics with the RF transmission stage 150 discussed previously. Such an RF signal may, for example, be associated with the composite signal output from the signal combiner 230 and upconverted by the upconverter 240. The RF transmission stage 250 may, for example and without limitation, comprise a power amplifier 252, antenna 254 and other components generally associated with RF signal transmission. *See, e.g.*, Rofougaran at 6:66-7:57. For example, the spectral placement module 510, optional second spectral placement module 520 and signal combiner 530 may operate in the analog domain. The first digital-to-analog converter 592 may convert the first baseband signal to the analog domain for processing by the spectral placement module 510. The second digital-to-analog converter 594 may convert the second baseband signal to the analog domain for processing by the second spectral placement module 520 or signal combiner 530. The signal combiner 530 then combines signals in the analog domain to generate an analog composite signal, which is then upconverted and transmitted by the upconverter 540 and RF transmission stage 550, respectively. *See, e.g.*, Rofougaran at 9:30-41. FIG. 7 is a diagram showing a portion of a seventh non-limiting exemplary communication system 700, in accordance with various aspects of the present invention. The exemplary communication system 700 may, for example and without limitation, share any or all characteristics with the exemplary systems 100-600 illustrated in FIGS. 1-6 and discussed previously. The exemplary communication system 700 may comprise a first mixer 744 that receives a spectrally shifted first baseband signal from the spectral placement module 710 and a first RF mixing signal (e.g., a 2.446 GHz signal generally associated with the Bluetooth communication protocol) from a

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	first local oscillator 742. The exemplary communication system 700 may also comprise a second mixer 748 that receives a second baseband signal (or a spectrally shifted second baseband signal) and a second RF mixing signal (e.g., a 2.486 GHz signal generally associated with the IEEE 802.11(g) communication protocol) from a second local oscillator 746. The exemplary communication system 700 may comprise an RF signal combiner 730 that is adapted to combine input RF signals. The RF signal combiner 730 may, for example, receive and combine the output signals from the first mixer 744 and second mixer 748 to generate an RF composite signal. The exemplary communication system 700 may also comprise a RF transmission stage 750 that receives the RF composite signal from the RF signal combiner 730 and transmit the signal. *See*, *e.g.*, Rofougaran at 10:18-43. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 810 comprises receiving the first baseband signal, step 810 may comprise receiving the first baseband signal in any manner generally associated with receiving a baseband signal. The first baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 810 may, for example, comprise generating the first baseband signal independently (e.g., corresponding to an independent communication). Step 810 may alternatively, for example, comprise generating the first baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first baseband signal and other baseband signals for a single communication). The exemplary method 800 may, at step 820, comprise spectrally placing (or shifting) the first baseband signal (e.g., received at step 810). Step 820 may, for example and without limitation, share any or all functional characteristics with the spectral placement modules 110-710 of the exemplary systems 100-700 illustrated in FIGS. 1-7 and discussed previously.

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	Step 820 may, for example, comprise spectrally shifting the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with a second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, step 820 may comprise implementing a frequency-hopping scheme with the first baseband signal. For example, in a scenario where there are one or more frequency bands (e.g., a second frequency space) associated with a second baseband signal, step 820 may comprise spectrally shifting the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. In another non-limiting exemplary scenario, spectrally shifting the first baseband signal may result in the production of a spectral image (e.g., frequency content mirrored about a mixing frequency utilized to spectrally shift the first baseband signal). In such a scenario, step 820 may comprise accepting or rejecting the image. In a scenario where an image is rejected, step 820 may comprise rejecting the image in any of a variety of manners. For example and without limitation, step 820 may comprise performing image reject mixing to spectrally shift the first baseband signal. Such image reject mixing generally comprises spectrally shifting a signal and rejecting an image associated with the spectrally shifted signal. Also for example, step 820 may comprise filtering out an unwanted image. The scope of various aspects of the present invention should not be limited by the utilization of image rejection or by any particular manner of performing such image rejection. The exemplary method 800 may, at step 830, comprise generating and/or receiving a second baseband signal corresponding to a second communication protocol (e.g., different from the first communication protocol). Step 830 may, for example and without limitation, share any or all functional characteristics with the second input 102 of the exemplary system 100 illustrated in FIG. 1 and discussed previously.

Claim 1 of the ’802 Patent	Prior Art Reference – Rofougaran
	The second baseband signal may, for example, correspond to a second communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 830 comprises receiving the second baseband signal, step 830 may comprise receiving the second baseband signal in any manner generally associated with receiving a baseband signal. The second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 830 may, for example, comprise generating the second baseband signal independently (e.g., corresponding to a communication independent of a communication associated with the first baseband signal). Step 830 may alternatively, for example, comprise generating the second baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the second baseband signal and the first baseband signal for a single communication). *See*, *e.g.*, Rofougaran at 11:53-13:4. Furthermore, this claim element is obvious in light of Rofougaran itself, when combined with any of the other references as charted for this claim element in Exs. A-1–A-31, First Supplemental Ex. A-Obviousness Chart, and/or when combined with the knowledge of one of ordinary skill in the art. Motivations to combine may come from the knowledge of the person of ordinary skill themselves, or from the known problems and predictable solutions as embodied in these references. Further motivations to combine references and additional details may be found in the Cover Pleading and First Supplemental Ex. A-Obviousness Chart.

Claim 2 of the ’802 Patent	Prior Art Reference – Rofougaran
[2.1] The method of claim 1	Rofougaran discloses all the elements of claim 1 for all the reasons provided above.
[2.2] wherein frequency difference between the first center frequency and the	Rofougaran discloses “wherein frequency difference between the first center frequency and the second center frequency is greater than the sum of one-half the first frequency range and one-half the second frequency range.” See, e.g.:

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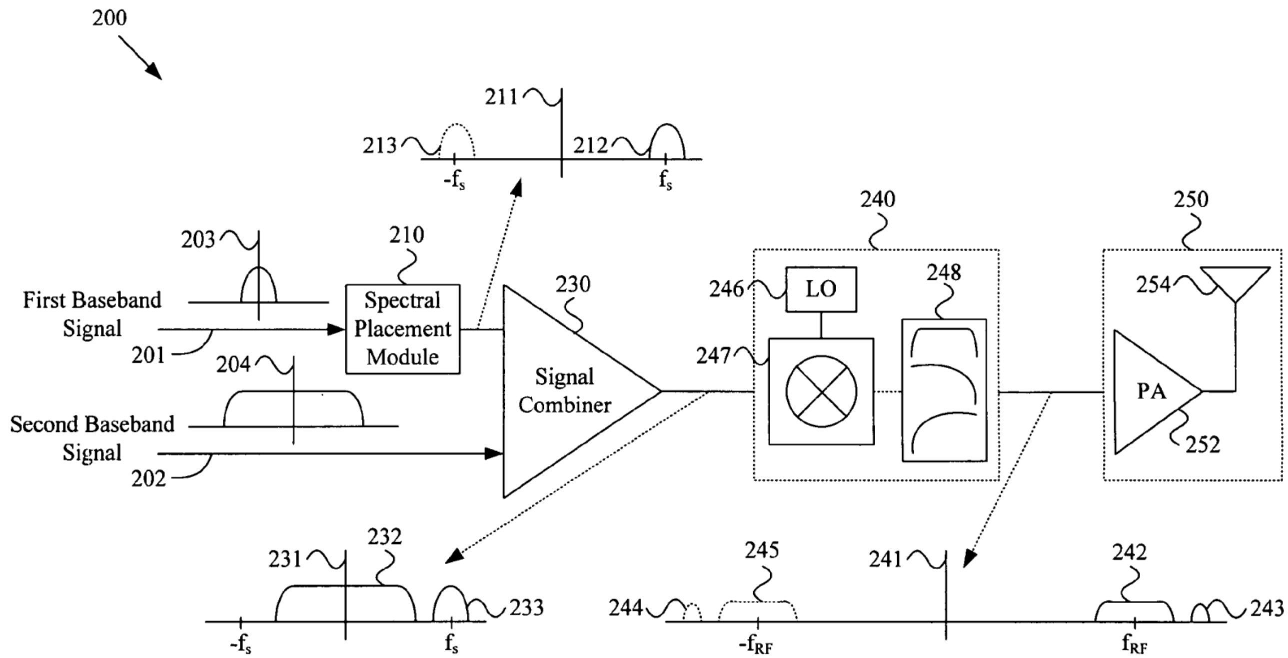
second center frequency is greater than the sum of one-half the first frequency range and one-half the second frequency range.	 Figure 2 *See, e.g.*, Rofougaran at Figure 2. FIG. 1 is a diagram showing a portion of a first non-limiting exemplary communication system 100, in accordance with various aspects of the present invention. The communication system (or device) may comprise characteristics of any of a variety of communication systems/devices (e.g., multimode wireless communication devices). For example and without limitation, the communication system may comprise characteristics of any of a variety of mobile wireless communication devices (e.g., cellular phones, paging devices, portable email devices, etc.). Also for example, the communication system may comprise characteristics of fixed communication systems or devices (e.g., network

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	access points, base stations, satellites, wireless routers, set top boxes, etc.). Further for example, the communication system may comprise characteristics of a variety of electronic devices with wireless communication capability (e.g., televisions, music players, cameras, remote controls, personal digital assistants, handheld computers, gaming devices, etc.). Accordingly, the scope of various aspects of the present invention should not be limited by characteristics of particular communication systems or devices. The following discussion will, at times, refer to various communication modes. A multimode communication device may, for example, be adapted to communicate in a plurality of such communication modes. For the following discussion, a communication mode may generally be considered to coincide with communication utilizing a particular communication protocol or standard. A non-limiting list of exemplary communication protocols includes various cellular communication protocols (e.g., GSM, GPRS, EDGE, CDMA, WCDMA, TDMA, PDC, etc.), various wireless networking protocols or standards, including WLAN, WMAN, WPAN and WWAN (e.g., IEEE 802.11, Bluetooth, IEEE 802.15, UWB, IEEE 802.16, IEEE 802.20, Zigbee, any WiFi protocol, etc.), various television communication standards, etc. The scope of various aspects of the present invention should not be limited by characteristics of particular communication modes or protocols, whether standard or proprietary. The exemplary communication system 100 may comprise at least a first input 101 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to any of the previously mentioned communication protocols. The exemplary communication system 100 may also comprise at least a second input 102 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first communication protocol discussed above). For example and without limitation, the second baseband signal may correspond to any of the previously mentioned communication protocols.

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	The first baseband signal and the second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of the communication system 100. For example, such modules may generate the first and second baseband signals independently (e.g., corresponding to independent respective communications). Alternatively, for example, such modules may generate the first and second baseband signals in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first and second baseband signals for a single communication). The exemplary communication system 100 may additionally comprise a spectral placement module 110 that is adapted to spectrally shift the first baseband signal (i.e., shift the frequency spectrum of the first baseband signal). In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to spectrally shift the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with the second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to implement a frequency-hopping scheme with the first baseband signal. For example, in a scenario, where there are one or more frequency bands (e.g., a second frequency space) associated with the second baseband signal, the spectral placement module 110 may be adapted to shift the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. *See, e.g.*, Rofougaran at 2:38-3:58. The exemplary communication system 100 may also comprise a second spectral placement module 120. Such a second spectral placement module 120 may, for example, share any or all characteristics with the spectral placement module 110 discussed previously. The incorporation of such a second spectral placement module 120 may, for example, provide spectral shifting flexibility. For example,

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<tr><th>Claim 2 of the ’802 Patent</th><th>Prior Art Reference – Rofougaran</th></tr>
<tr><td></td><td>in such an exemplary configuration, either or both of the first and second baseband signals may be spectrally shifted to substantially distinct frequency spaces. Also for example, in such an exemplary configuration, either or both of the first and second baseband signals may be frequency hopped. Note that though the second spectral placement module 120 is illustrated separate from the first spectral placement module 110, the second spectral placement module 120 may share any or all hardware and/or software components with the spectral placement module 110.

The exemplary communication system 100 may further comprise a signal combiner 130 that is adapted to generate a composite signal comprising various input signals to the signal combiner 130. For example, the composite signal may simultaneously (i.e., at an instant in time) comprise components associated with various input signals. Note that such simultaneity need not always be present. For example, at a first instant in time, the signal output from the signal combiner 130 might comprise a plurality of components associated with a plurality of respective input signals, at a second instant in time, the signal output from the signal combiner 130 might comprise a single component associated with a single respective input signal, and at a third instant in time, the signal output from the signal combiner 130 might comprise no components.

In a first non-limiting exemplary scenario, the signal combiner 130 may receive a first signal that is based on the first baseband signal (e.g., associated with a first communication protocol). Also, the signal combiner 130 may receive a second signal that is based on the second baseband signal (e.g., associated with a second communication protocol). In such a scenario, the signal combiner 130 may combine the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the first baseband signal and a second signal component based on the second baseband signal. In such a scenario, for example where the frequency spectra of the first and second baseband signals do not overlap, the first and second baseband signals might not be spectrally shifted prior to combining by the signal combiner 130. In such a scenario, the spectral placement module 110 (and optionally, the second spectral placement module 120) may receive a control signal indicating whether or not to perform spectral shifting and/or to what degree spectral shifting should be implemented.

See, e.g., Rofougaran at 4:16-67.</td></tr>
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	Various components of the exemplary communication system 100 (and other communication systems illustrated and discussed herein) may be implemented in analog and/or digital circuitry. To illustrate this, the exemplary communication system 100 is not shown with analog-to-digital converters (ADCs) or digital-to-analog converters (DACs). FIGS. 4-6, to be discussed later, show various non-limiting exemplary configurations including such converters. FIG. 2 is a diagram showing a portion of a second non-limiting exemplary communication system 200, in accordance with various aspects of the present invention. The communication system 200 may, for example and without limitation, share any or all characteristics with the communication system 100 illustrated in FIG. 1 and discussed previously. The exemplary communication system 200 may comprise at least a first input 201 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to the Bluetooth communication protocol. FIG. 2 shows an exemplary frequency spectrum 203 associated with the first baseband signal. The exemplary communication system 200 may also comprise at least a second input 202 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first communication protocol discussed above). For example and without limitation, the first baseband signal may correspond to an IEEE 802.11 communication protocol (e.g., IEEE 802.11(b) or IEEE 802.11(g)). FIG. 2 shows an exemplary frequency spectrum 204 associated with the second baseband signal. *See, e.g.*, Rofougaran at 5:64-6:31. In a non-limiting exemplary configuration illustrated in FIG. 2, the signal combiner 230 receives a first signal from the spectral placement module 210 that is based on the spectrally shifted first

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	baseband signal. Also, the signal combiner 230 receives a second signal that is based on the second baseband signal. In such a configuration, the signal combiner 230 combines the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the spectrally shifted first baseband signal and a second signal component based on the second baseband signal (e.g., not spectrally shifted). FIG. 2 shows an exemplary frequency spectrum 231 associated with the composite signal formed by the signal combiner 230. The spectrum 231 comprises a first portion 233 corresponding to the first signal component, and a second portion 232 corresponding to the second signal component. Note that the first portion 233 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 232. The exemplary communication system 200 may also comprise an upconverter 240 adapted to upconvert a signal (e.g., the composite signal from the signal combiner 230) for transmission. The upconverter 240 may, for example and without limitation, share any or all characteristics with the upconverter 140 discussed previously. The upconverter 240 may, for example, comprise a mixer 247, a local oscillator 246 and one or more filters 248. The mixer 247 may, for example, receive the composite signal from the signal combiner 230 and an RF mixing signal at frequency fRF from a local oscillator 246. The upconverter 240 may, for example, filter the upconverted signal from the mixer 247 with one or more filters 248. The output of the upconverter 240 may, for example, comprise a signal indicative of the composite signal spectrally shifted to an RF frequency. FIG. 2 shows an exemplary frequency spectrum 241 associated with the RF signal formed by the upconverter 240. The frequency spectrum 241 comprises a first portion 243 corresponding to the first signal component and a second portion 242 corresponding to the second signal component. Note that the first portion 243 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 242. Also note that the first portion 243 and second portion 242 might be formed with a first mirror portion 244 and second mirror portion 245, respectively. Note that a mirror portion may either be removed or may be kept for later processing.

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	The exemplary communication system 200 may further comprise a RF transmission stage 250 adapted to transmit an RF signal. The RF transmission stage 250 may, for example and without limitation, share any or all characteristics with the RF transmission stage 150 discussed previously. Such an RF signal may, for example, be associated with the composite signal output from the signal combiner 230 and upconverted by the upconverter 240. The RF transmission stage 250 may, for example and without limitation, comprise a power amplifier 252, antenna 254 and other components generally associated with RF signal transmission. *See, e.g.*, Rofougaran at 6:66-7:57. For example, the spectral placement module 510, optional second spectral placement module 520 and signal combiner 530 may operate in the analog domain. The first digital-to-analog converter 592 may convert the first baseband signal to the analog domain for processing by the spectral placement module 510. The second digital-to-analog converter 594 may convert the second baseband signal to the analog domain for processing by the second spectral placement module 520 or signal combiner 530. The signal combiner 530 then combines signals in the analog domain to generate an analog composite signal, which is then upconverted and transmitted by the upconverter 540 and RF transmission stage 550, respectively. *See, e.g.*, Rofougaran at 9:30-41. FIG. 7 is a diagram showing a portion of a seventh non-limiting exemplary communication system 700, in accordance with various aspects of the present invention. The exemplary communication system 700 may, for example and without limitation, share any or all characteristics with the exemplary systems 100-600 illustrated in FIGS. 1-6 and discussed previously. The exemplary communication system 700 may comprise a first mixer 744 that receives a spectrally shifted first baseband signal from the spectral placement module 710 and a first RF mixing signal (e.g., a 2.446 GHz signal generally associated with the Bluetooth communication protocol) from a first local oscillator 742. The exemplary communication system 700 may also comprise a second mixer 748 that receives a second baseband signal (or a spectrally shifted second baseband signal) and

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	a second RF mixing signal (e.g., a 2.486 GHz signal generally associated with the IEEE 802.11(g) communication protocol) from a second local oscillator 746. The exemplary communication system 700 may comprise an RF signal combiner 730 that is adapted to combine input RF signals. The RF signal combiner 730 may, for example, receive and combine the output signals from the first mixer 744 and second mixer 748 to generate an RF composite signal. The exemplary communication system 700 may also comprise a RF transmission stage 750 that receives the RF composite signal from the RF signal combiner 730 and transmit the signal. *See, e.g.*, Rofougaran at 10:18-43. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 810 comprises receiving the first baseband signal, step 810 may comprise receiving the first baseband signal in any manner generally associated with receiving a baseband signal. The first baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 810 may, for example, comprise generating the first baseband signal independently (e.g., corresponding to an independent communication). Step 810 may alternatively, for example, comprise generating the first baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first baseband signal and other baseband signals for a single communication). The exemplary method 800 may, at step 820, comprise spectrally placing (or shifting) the first baseband signal (e.g., received at step 810). Step 820 may, for example and without limitation, share any or all functional characteristics with the spectral placement modules 110-710 of the exemplary systems 100-700 illustrated in FIGS. 1-7 and discussed previously. Step 820 may, for example, comprise spectrally shifting the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially

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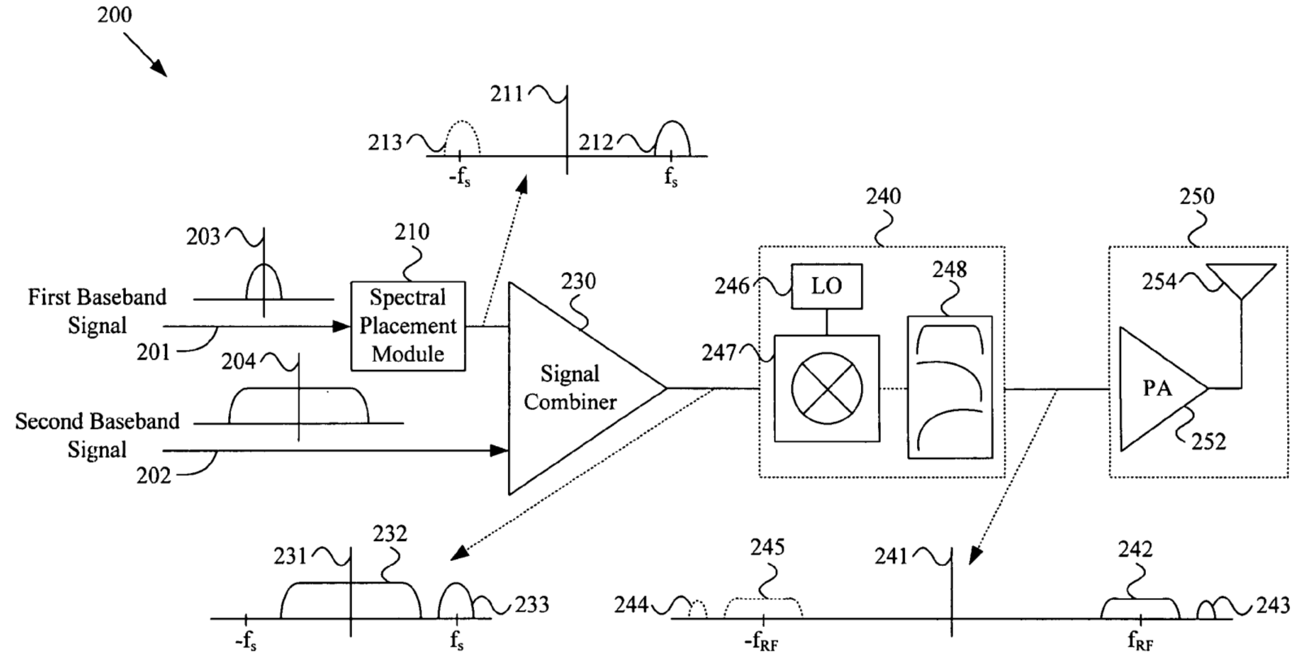
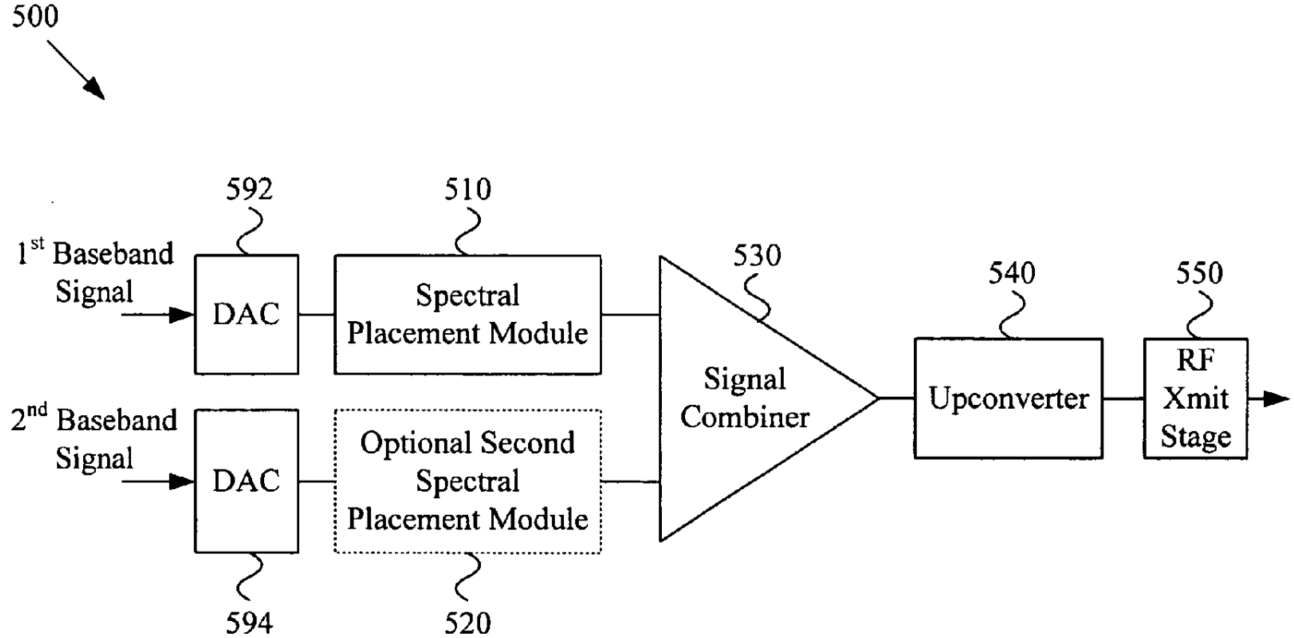
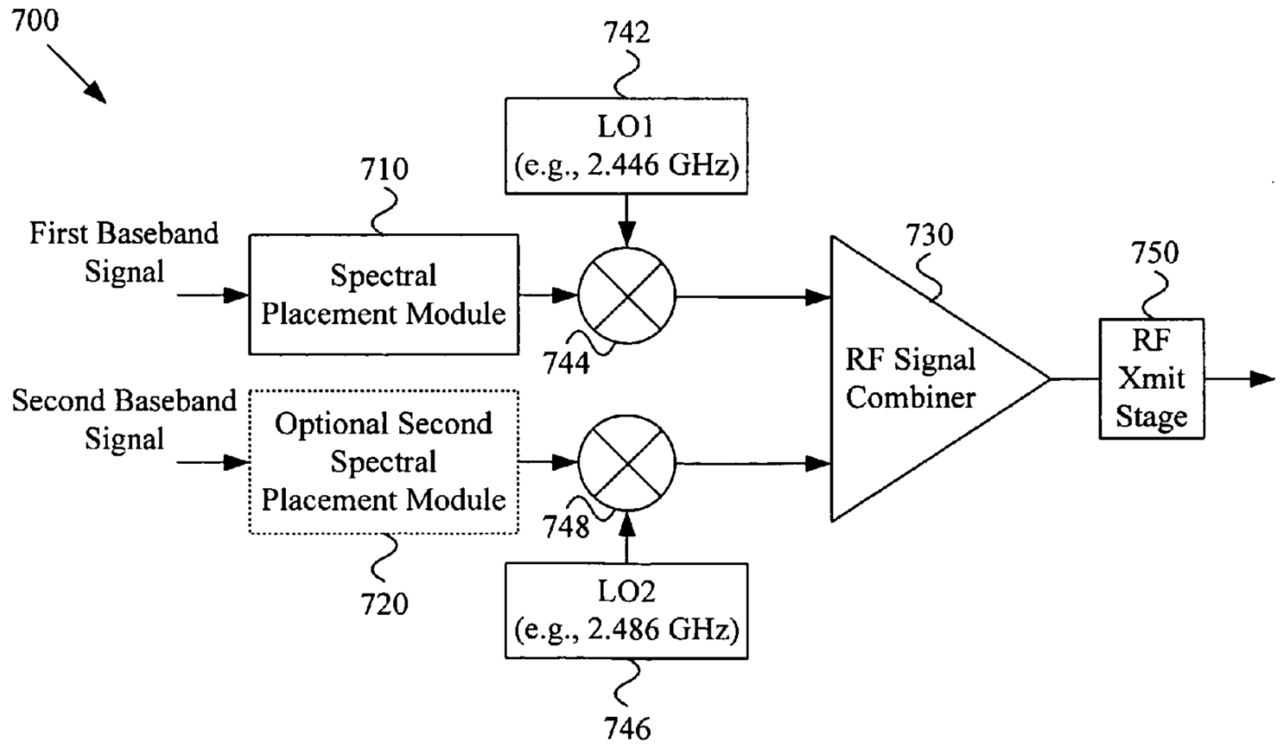
	distinct from one or more frequency bands associated with a second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, step 820 may comprise implementing a frequency-hopping scheme with the first baseband signal. For example, in a scenario where there are one or more frequency bands (e.g., a second frequency space) associated with a second baseband signal, step 820 may comprise spectrally shifting the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. In another non-limiting exemplary scenario, spectrally shifting the first baseband signal may result in the production of a spectral image (e.g., frequency content mirrored about a mixing frequency utilized to spectrally shift the first baseband signal). In such a scenario, step 820 may comprise accepting or rejecting the image. In a scenario where an image is rejected, step 820 may comprise rejecting the image in any of a variety of manners. For example and without limitation, step 820 may comprise performing image reject mixing to spectrally shift the first baseband signal. Such image reject mixing generally comprises spectrally shifting a signal and rejecting an image associated with the spectrally shifted signal. Also for example, step 820 may comprise filtering out an unwanted image. The scope of various aspects of the present invention should not be limited by the utilization of image rejection or by any particular manner of performing such image rejection. The exemplary method 800 may, at step 830, comprise generating and/or receiving a second baseband signal corresponding to a second communication protocol (e.g., different from the first communication protocol). Step 830 may, for example and without limitation, share any or all functional characteristics with the second input 102 of the exemplary system 100 illustrated in FIG. 1 and discussed previously.

Claim 2 of the ’802 Patent	Prior Art Reference – Rofougaran
	The second baseband signal may, for example, correspond to a second communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 830 comprises receiving the second baseband signal, step 830 may comprise receiving the second baseband signal in any manner generally associated with receiving a baseband signal. The second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 830 may, for example, comprise generating the second baseband signal independently (e.g., corresponding to a communication independent of a communication associated with the first baseband signal). Step 830 may alternatively, for example, comprise generating the second baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the second baseband signal and the first baseband signal for a single communication). *See, e.g.*, Rofougaran at 11:53-13:4. Furthermore, this claim element is obvious in light of Rofougaran itself, when combined with any of the other references as charted for this claim element in Exs. A-1–A-31, First Supplemental Ex. A-Obviousness Chart, and/or when combined with the knowledge of one of ordinary skill in the art. Motivations to combine may come from the knowledge of the person of ordinary skill themselves, or from the known problems and predictable solutions as embodied in these references. Further motivations to combine references and additional details may be found in the Cover Pleading and First Supplemental Ex. A-Obviousness Chart.

Claim 3 of the ’802 Patent	Prior Art Reference – Rofougaran
[3.1] The method of claim 1	Rofougaran discloses all the elements of claim 1 for all the reasons provided above.
[3.2] wherein the first and second information are transmitted using the same	Rofougaran discloses “wherein the first and second information are transmitted using the same power amplifier in said wireless transmitter.” See, e.g.:

Claim 3 of the '802 Patent	Prior Art Reference – Rofougaran
power amplifier in said wireless transmitter.	 Figure 2 *See, e.g.*, Rofougaran at Figure 2.

Claim 3 of the '802 Patent	Prior Art Reference – Rofougaran
	 Figure 5 *See, e.g.*, Rofougaran at Figure 5.

Claim 3 of the '802 Patent	**Prior Art Reference – Rofougaran**
	 Figure 7 *See, e.g.*, Rofougaran at Figure 7. FIG. 1 is a diagram showing a portion of a first non-limiting exemplary communication system 100, in accordance with various aspects of the present invention. The communication system (or device) may comprise characteristics of any of a variety of communication systems/devices (e.g., multimode wireless communication devices). For example and without limitation, the communication system may comprise characteristics of any of a variety of mobile wireless communication devices (e.g.,

Claim 3 of the ’802 Patent	Prior Art Reference – Rofougaran
	cellular phones, paging devices, portable email devices, etc.). Also for example, the communication system may comprise characteristics of fixed communication systems or devices (e.g., network access points, base stations, satellites, wireless routers, set top boxes, etc.). Further for example, the communication system may comprise characteristics of a variety of electronic devices with wireless communication capability (e.g., televisions, music players, cameras, remote controls, personal digital assistants, handheld computers, gaming devices, etc.). Accordingly, the scope of various aspects of the present invention should not be limited by characteristics of particular communication systems or devices. The following discussion will, at times, refer to various communication modes. A multimode communication device may, for example, be adapted to communicate in a plurality of such communication modes. For the following discussion, a communication mode may generally be considered to coincide with communication utilizing a particular communication protocol or standard. A non-limiting list of exemplary communication protocols includes various cellular communication protocols (e.g., GSM, GPRS, EDGE, CDMA, WCDMA, TDMA, PDC, etc.), various wireless networking protocols or standards, including WLAN, WMAN, WPAN and WWAN (e.g., IEEE 802.11, Bluetooth, IEEE 802.15, UWB, IEEE 802.16, IEEE 802.20, Zigbee, any WiFi protocol, etc.), various television communication standards, etc. The scope of various aspects of the present invention should not be limited by characteristics of particular communication modes or protocols, whether standard or proprietary. The exemplary communication system 100 may comprise at least a first input 101 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to any of the previously mentioned communication protocols. The exemplary communication system 100 may also comprise at least a second input 102 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first

Claim 3 of the ’802 Patent	Prior Art Reference – Rofougaran
	communication protocol discussed above). For example and without limitation, the second baseband signal may correspond to any of the previously mentioned communication protocols. The first baseband signal and the second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of the communication system 100. For example, such modules may generate the first and second baseband signals independently (e.g., corresponding to independent respective communications). Alternatively, for example, such modules may generate the first and second baseband signals in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first and second baseband signals for a single communication). The exemplary communication system 100 may additionally comprise a spectral placement module 110 that is adapted to spectrally shift the first baseband signal (i.e., shift the frequency spectrum of the first baseband signal). In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to spectrally shift the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with the second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to implement a frequency-hopping scheme with the first baseband signal. For example, in a scenario, where there are one or more frequency bands (e.g., a second frequency space) associated with the second baseband signal, the spectral placement module 110 may be adapted to shift the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. *See, e.g.*, Rofougaran at 2:38-3:58. The exemplary communication system 100 may also comprise a second spectral placement module 120. Such a second spectral placement module 120 may, for example, share any or all characteristics

Claim 3 of the '802 Patent	Prior Art Reference – Rofougaran
	with the spectral placement module 110 discussed previously. The incorporation of such a second spectral placement module 120 may, for example, provide spectral shifting flexibility. For example, in such an exemplary configuration, either or both of the first and second baseband signals may be spectrally shifted to substantially distinct frequency spaces. Also for example, in such an exemplary configuration, either or both of the first and second baseband signals may be frequency hopped. Note that though the second spectral placement module 120 is illustrated separate from the first spectral placement module 110, the second spectral placement module 120 may share any or all hardware and/or software components with the spectral placement module 110. The exemplary communication system 100 may further comprise a signal combiner 130 that is adapted to generate a composite signal comprising various input signals to the signal combiner 130. For example, the composite signal may simultaneously (i.e., at an instant in time) comprise components associated with various input signals. Note that such simultaneity need not always be present. For example, at a first instant in time, the signal output from the signal combiner 130 might comprise a plurality of components associated with a plurality of respective input signals, at a second instant in time, the signal output from the signal combiner 130 might comprise a single component associated with a single respective input signal, and at a third instant in time, the signal output from the signal combiner 130 might comprise no components. In a first non-limiting exemplary scenario, the signal combiner 130 may receive a first signal that is based on the first baseband signal (e.g., associated with a first communication protocol). Also, the signal combiner 130 may receive a second signal that is based on the second baseband signal (e.g., associated with a second communication protocol). In such a scenario, the signal combiner 130 may combine the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the first baseband signal and a second signal component based on the second baseband signal. In such a scenario, for example where the frequency spectra of the first and second baseband signals do not overlap, the first and second baseband signals might not be spectrally shifted prior to combining by the signal combiner 130. In such a scenario, the spectral placement module 110 (and optionally, the second spectral placement module 120) may receive a control signal indicating whether or not to perform spectral shifting and/or to what degree spectral shifting should be implemented.

Claim 3 of the '802 Patent	**Prior Art Reference – Rofougaran**
	See, e.g., Rofougaran at 4:16-67. Various components of the exemplary communication system 100 (and other communication systems illustrated and discussed herein) may be implemented in analog and/or digital circuitry. To illustrate this, the exemplary communication system 100 is not shown with analog-to-digital converters (ADCs) or digital-to-analog converters (DACs). FIGS. 4-6, to be discussed later, show various non-limiting exemplary configurations including such converters. FIG. 2 is a diagram showing a portion of a second non-limiting exemplary communication system 200, in accordance with various aspects of the present invention. The communication system 200 may, for example and without limitation, share any or all characteristics with the communication system 100 illustrated in FIG. 1 and discussed previously. The exemplary communication system 200 may comprise at least a first input 201 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to the Bluetooth communication protocol. FIG. 2 shows an exemplary frequency spectrum 203 associated with the first baseband signal. The exemplary communication system 200 may also comprise at least a second input 202 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first communication protocol discussed above). For example and without limitation, the first baseband signal may correspond to an IEEE 802.11 communication protocol (e.g., IEEE 802.11(b) or IEEE 802.11(g)). FIG. 2 shows an exemplary frequency spectrum 204 associated with the second baseband signal. *See, e.g.*, Rofougaran at 5:64-6:31.

Claim 3 of the '802 Patent	Prior Art Reference – Rofougaran
	In a non-limiting exemplary configuration illustrated in FIG. 2, the signal combiner 230 receives a first signal from the spectral placement module 210 that is based on the spectrally shifted first baseband signal. Also, the signal combiner 230 receives a second signal that is based on the second baseband signal. In such a configuration, the signal combiner 230 combines the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the spectrally shifted first baseband signal and a second signal component based on the second baseband signal (e.g., not spectrally shifted). FIG. 2 shows an exemplary frequency spectrum 231 associated with the composite signal formed by the signal combiner 230. The spectrum 231 comprises a first portion 233 corresponding to the first signal component, and a second portion 232 corresponding to the second signal component. Note that the first portion 233 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 232. The exemplary communication system 200 may also comprise an upconverter 240 adapted to upconvert a signal (e.g., the composite signal from the signal combiner 230) for transmission. The upconverter 240 may, for example and without limitation, share any or all characteristics with the upconverter 140 discussed previously. The upconverter 240 may, for example, comprise a mixer 247, a local oscillator 246 and one or more filters 248. The mixer 247 may, for example, receive the composite signal from the signal combiner 230 and an RF mixing signal at frequency fRF from a local oscillator 246. The upconverter 240 may, for example, filter the upconverted signal from the mixer 247 with one or more filters 248. The output of the upconverter 240 may, for example, comprise a signal indicative of the composite signal spectrally shifted to an RF frequency. FIG. 2 shows an exemplary frequency spectrum 241 associated with the RF signal formed by the upconverter 240. The frequency spectrum 241 comprises a first portion 243 corresponding to the first signal component and a second portion 242 corresponding to the second signal component. Note that the first portion 243 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 242. Also note that the first portion 243 and

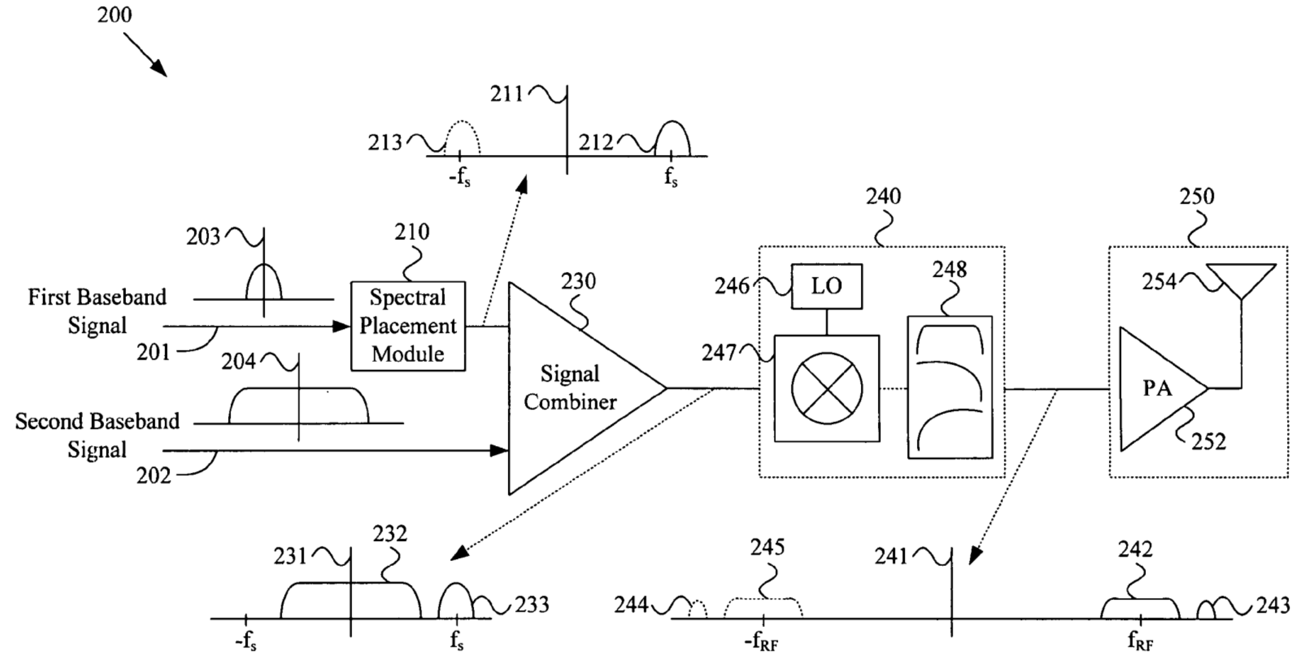
Claim 3 of the '802 Patent	Prior Art Reference – Rofougaran
	second portion 242 might be formed with a first mirror portion 244 and second mirror portion 245, respectively. Note that a mirror portion may either be removed or may be kept for later processing. The exemplary communication system 200 may further comprise a RF transmission stage 250 adapted to transmit an RF signal. The RF transmission stage 250 may, for example and without limitation, share any or all characteristics with the RF transmission stage 150 discussed previously. Such an RF signal may, for example, be associated with the composite signal output from the signal combiner 230 and upconverted by the upconverter 240. The RF transmission stage 250 may, for example and without limitation, comprise a power amplifier 252, antenna 254 and other components generally associated with RF signal transmission. *See, e.g.*, Rofougaran at 6:66-7:57. For example, the spectral placement module 510, optional second spectral placement module 520 and signal combiner 530 may operate in the analog domain. The first digital-to-analog converter 592 may convert the first baseband signal to the analog domain for processing by the spectral placement module 510. The second digital-to-analog converter 594 may convert the second baseband signal to the analog domain for processing by the second spectral placement module 520 or signal combiner 530. The signal combiner 530 then combines signals in the analog domain to generate an analog composite signal, which is then upconverted and transmitted by the upconverter 540 and RF transmission stage 550, respectively. *See, e.g.*, Rofougaran at 9:30-41. FIG. 7 is a diagram showing a portion of a seventh non-limiting exemplary communication system 700, in accordance with various aspects of the present invention. The exemplary communication system 700 may, for example and without limitation, share any or all characteristics with the exemplary systems 100-600 illustrated in FIGS. 1-6 and discussed previously. The exemplary communication system 700 may comprise a first mixer 744 that receives a spectrally shifted first baseband signal from the spectral placement module 710 and a first RF mixing signal (e.g., a 2.446 GHz signal generally associated with the Bluetooth communication protocol) from a

Claim 3 of the ’802 Patent	Prior Art Reference – Rofougaran
	first local oscillator 742. The exemplary communication system 700 may also comprise a second mixer 748 that receives a second baseband signal (or a spectrally shifted second baseband signal) and a second RF mixing signal (e.g., a 2.486 GHz signal generally associated with the IEEE 802.11(g) communication protocol) from a second local oscillator 746. The exemplary communication system 700 may comprise an RF signal combiner 730 that is adapted to combine input RF signals. The RF signal combiner 730 may, for example, receive and combine the output signals from the first mixer 744 and second mixer 748 to generate an RF composite signal. The exemplary communication system 700 may also comprise a RF transmission stage 750 that receives the RF composite signal from the RF signal combiner 730 and transmit the signal. *See*, *e.g.*, Rofougaran at 10:18-43. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 810 comprises receiving the first baseband signal, step 810 may comprise receiving the first baseband signal in any manner generally associated with receiving a baseband signal. The first baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 810 may, for example, comprise generating the first baseband signal independently (e.g., corresponding to an independent communication). Step 810 may alternatively, for example, comprise generating the first baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first baseband signal and other baseband signals for a single communication). The exemplary method 800 may, at step 820, comprise spectrally placing (or shifting) the first baseband signal (e.g., received at step 810). Step 820 may, for example and without limitation, share any or all functional characteristics with the spectral placement modules 110-710 of the exemplary systems 100-700 illustrated in FIGS. 1-7 and discussed previously.

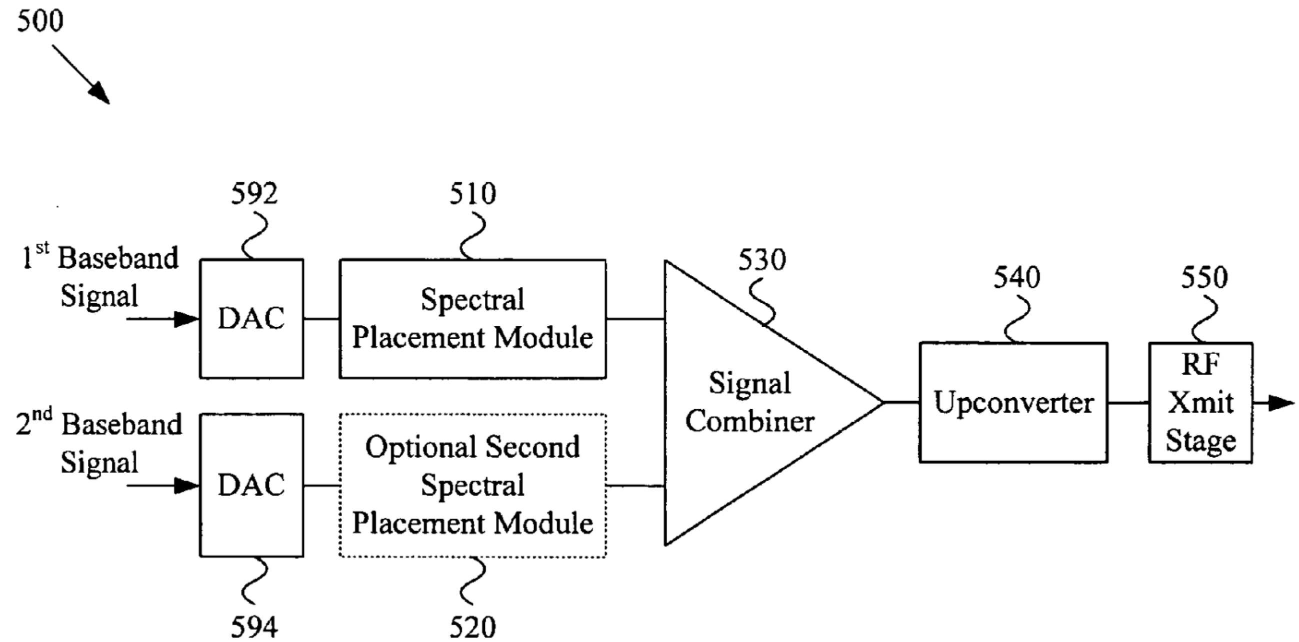
Claim 3 of the ’802 Patent	Prior Art Reference – Rofougaran
	Step 820 may, for example, comprise spectrally shifting the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with a second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, step 820 may comprise implementing a frequency-hopping scheme with the first baseband signal. For example, in a scenario where there are one or more frequency bands (e.g., a second frequency space) associated with a second baseband signal, step 820 may comprise spectrally shifting the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. In another non-limiting exemplary scenario, spectrally shifting the first baseband signal may result in the production of a spectral image (e.g., frequency content mirrored about a mixing frequency utilized to spectrally shift the first baseband signal). In such a scenario, step 820 may comprise accepting or rejecting the image. In a scenario where an image is rejected, step 820 may comprise rejecting the image in any of a variety of manners. For example and without limitation, step 820 may comprise performing image reject mixing to spectrally shift the first baseband signal. Such image reject mixing generally comprises spectrally shifting a signal and rejecting an image associated with the spectrally shifted signal. Also for example, step 820 may comprise filtering out an unwanted image. The scope of various aspects of the present invention should not be limited by the utilization of image rejection or by any particular manner of performing such image rejection. The exemplary method 800 may, at step 830, comprise generating and/or receiving a second baseband signal corresponding to a second communication protocol (e.g., different from the first communication protocol). Step 830 may, for example and without limitation, share any or all functional characteristics with the second input 102 of the exemplary system 100 illustrated in FIG. 1 and discussed previously.

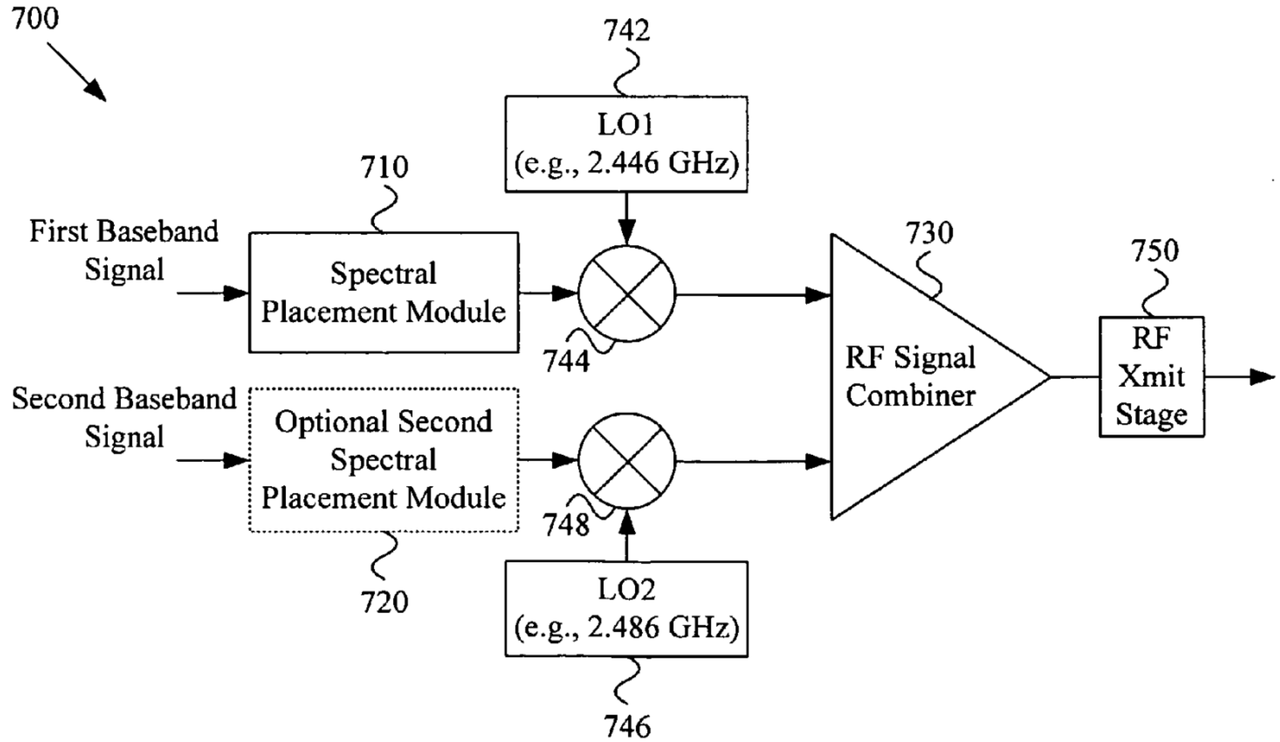
Claim 3 of the ’802 Patent	Prior Art Reference – Rofougaran
	The second baseband signal may, for example, correspond to a second communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 830 comprises receiving the second baseband signal, step 830 may comprise receiving the second baseband signal in any manner generally associated with receiving a baseband signal. The second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 830 may, for example, comprise generating the second baseband signal independently (e.g., corresponding to a communication independent of a communication associated with the first baseband signal). Step 830 may alternatively, for example, comprise generating the second baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the second baseband signal and the first baseband signal for a single communication). *See*, *e.g.*, Rofougaran at 11:53-13:4. Furthermore, this claim element is obvious in light of Rofougaran itself, when combined with any of the other references as charted for this claim element in Exs. A-1–A-31, First Supplemental Ex. A-Obviousness Chart, and/or when combined with the knowledge of one of ordinary skill in the art. Motivations to combine may come from the knowledge of the person of ordinary skill themselves, or from the known problems and predictable solutions as embodied in these references. Further motivations to combine references and additional details may be found in the Cover Pleading and First Supplemental Ex. A-Obviousness Chart.

Claim 4 of the ’802 Patent	Prior Art Reference – Rofougaran
[4.1] The method of claim 3	Rofougaran discloses all the elements of claim 3 for all the reasons provided above.
[4.2] wherein the bandwidth of said power amplifier is greater than the difference	Rofougaran discloses “wherein the bandwidth of said power amplifier is greater than the difference between the first lowest frequency and the second highest frequency.” See, e.g.:

<table>
<tr><th>Claim 4 of the ’802 Patent</th><th>Prior Art Reference – Rofougaran</th></tr>
<tr><td>between the first lowest frequency and the second highest frequency.</td><td>
Figure 2

See, e.g., Rofougaran at Figure 2.</td></tr>
</table>

Claim 4 of the '802 Patent	Prior Art Reference – Rofougaran
	 Figure 5 *See, e.g.*, Rofougaran at Figure 5.

Claim 4 of the '802 Patent	Prior Art Reference – Rofougaran
	 Figure 7 *See, e.g.*, Rofougaran at Figure 7. FIG. 1 is a diagram showing a portion of a first non-limiting exemplary communication system 100, in accordance with various aspects of the present invention. The communication system (or device) may comprise characteristics of any of a variety of communication systems/devices (e.g., multimode wireless communication devices). For example and without limitation, the communication system may comprise characteristics of any of a variety of mobile wireless communication devices (e.g.,

Claim 4 of the '802 Patent	Prior Art Reference – Rofougaran
	cellular phones, paging devices, portable email devices, etc.). Also for example, the communication system may comprise characteristics of fixed communication systems or devices (e.g., network access points, base stations, satellites, wireless routers, set top boxes, etc.). Further for example, the communication system may comprise characteristics of a variety of electronic devices with wireless communication capability (e.g., televisions, music players, cameras, remote controls, personal digital assistants, handheld computers, gaming devices, etc.). Accordingly, the scope of various aspects of the present invention should not be limited by characteristics of particular communication systems or devices. The following discussion will, at times, refer to various communication modes. A multimode communication device may, for example, be adapted to communicate in a plurality of such communication modes. For the following discussion, a communication mode may generally be considered to coincide with communication utilizing a particular communication protocol or standard. A non-limiting list of exemplary communication protocols includes various cellular communication protocols (e.g., GSM, GPRS, EDGE, CDMA, WCDMA, TDMA, PDC, etc.), various wireless networking protocols or standards, including WLAN, WMAN, WPAN and WWAN (e.g., IEEE 802.11, Bluetooth, IEEE 802.15, UWB, IEEE 802.16, IEEE 802.20, Zigbee, any WiFi protocol, etc.), various television communication standards, etc. The scope of various aspects of the present invention should not be limited by characteristics of particular communication modes or protocols, whether standard or proprietary. The exemplary communication system 100 may comprise at least a first input 101 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to any of the previously mentioned communication protocols. The exemplary communication system 100 may also comprise at least a second input 102 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first

Claim 4 of the ’802 Patent	**Prior Art Reference – Rofougaran**
	communication protocol discussed above). For example and without limitation, the second baseband signal may correspond to any of the previously mentioned communication protocols. The first baseband signal and the second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of the communication system 100. For example, such modules may generate the first and second baseband signals independently (e.g., corresponding to independent respective communications). Alternatively, for example, such modules may generate the first and second baseband signals in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first and second baseband signals for a single communication). The exemplary communication system 100 may additionally comprise a spectral placement module 110 that is adapted to spectrally shift the first baseband signal (i.e., shift the frequency spectrum of the first baseband signal). In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to spectrally shift the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with the second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to implement a frequency-hopping scheme with the first baseband signal. For example, in a scenario, where there are one or more frequency bands (e.g., a second frequency space) associated with the second baseband signal, the spectral placement module 110 may be adapted to shift the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. *See, e.g.*, Rofougaran at 2:38-3:58. The exemplary communication system 100 may also comprise a second spectral placement module 120. Such a second spectral placement module 120 may, for example, share any or all characteristics

Claim 4 of the '802 Patent	Prior Art Reference – Rofougaran
	with the spectral placement module 110 discussed previously. The incorporation of such a second spectral placement module 120 may, for example, provide spectral shifting flexibility. For example, in such an exemplary configuration, either or both of the first and second baseband signals may be spectrally shifted to substantially distinct frequency spaces. Also for example, in such an exemplary configuration, either or both of the first and second baseband signals may be frequency hopped. Note that though the second spectral placement module 120 is illustrated separate from the first spectral placement module 110, the second spectral placement module 120 may share any or all hardware and/or software components with the spectral placement module 110. The exemplary communication system 100 may further comprise a signal combiner 130 that is adapted to generate a composite signal comprising various input signals to the signal combiner 130. For example, the composite signal may simultaneously (i.e., at an instant in time) comprise components associated with various input signals. Note that such simultaneity need not always be present. For example, at a first instant in time, the signal output from the signal combiner 130 might comprise a plurality of components associated with a plurality of respective input signals, at a second instant in time, the signal output from the signal combiner 130 might comprise a single component associated with a single respective input signal, and at a third instant in time, the signal output from the signal combiner 130 might comprise no components. In a first non-limiting exemplary scenario, the signal combiner 130 may receive a first signal that is based on the first baseband signal (e.g., associated with a first communication protocol). Also, the signal combiner 130 may receive a second signal that is based on the second baseband signal (e.g., associated with a second communication protocol). In such a scenario, the signal combiner 130 may combine the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the first baseband signal and a second signal component based on the second baseband signal. In such a scenario, for example where the frequency spectra of the first and second baseband signals do not overlap, the first and second baseband signals might not be spectrally shifted prior to combining by the signal combiner 130. In such a scenario, the spectral placement module 110 (and optionally, the second spectral placement module 120) may receive a control signal indicating whether or not to perform spectral shifting and/or to what degree spectral shifting should be implemented.

Claim 4 of the ’802 Patent	Prior Art Reference – Rofougaran
	See, e.g., Rofougaran at 4:16-67. Various components of the exemplary communication system 100 (and other communication systems illustrated and discussed herein) may be implemented in analog and/or digital circuitry. To illustrate this, the exemplary communication system 100 is not shown with analog-to-digital converters (ADCs) or digital-to-analog converters (DACs). FIGS. 4-6, to be discussed later, show various non-limiting exemplary configurations including such converters. FIG. 2 is a diagram showing a portion of a second non-limiting exemplary communication system 200, in accordance with various aspects of the present invention. The communication system 200 may, for example and without limitation, share any or all characteristics with the communication system 100 illustrated in FIG. 1 and discussed previously. The exemplary communication system 200 may comprise at least a first input 201 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to the Bluetooth communication protocol. FIG. 2 shows an exemplary frequency spectrum 203 associated with the first baseband signal. The exemplary communication system 200 may also comprise at least a second input 202 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first communication protocol discussed above). For example and without limitation, the first baseband signal may correspond to an IEEE 802.11 communication protocol (e.g., IEEE 802.11(b) or IEEE 802.11(g)). FIG. 2 shows an exemplary frequency spectrum 204 associated with the second baseband signal. *See, e.g.*, Rofougaran at 5:64-6:31.

Claim 4 of the '802 Patent	Prior Art Reference – Rofougaran
	In a non-limiting exemplary configuration illustrated in FIG. 2, the signal combiner 230 receives a first signal from the spectral placement module 210 that is based on the spectrally shifted first baseband signal. Also, the signal combiner 230 receives a second signal that is based on the second baseband signal. In such a configuration, the signal combiner 230 combines the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the spectrally shifted first baseband signal and a second signal component based on the second baseband signal (e.g., not spectrally shifted). FIG. 2 shows an exemplary frequency spectrum 231 associated with the composite signal formed by the signal combiner 230. The spectrum 231 comprises a first portion 233 corresponding to the first signal component, and a second portion 232 corresponding to the second signal component. Note that the first portion 233 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 232. The exemplary communication system 200 may also comprise an upconverter 240 adapted to upconvert a signal (e.g., the composite signal from the signal combiner 230) for transmission. The upconverter 240 may, for example and without limitation, share any or all characteristics with the upconverter 140 discussed previously. The upconverter 240 may, for example, comprise a mixer 247, a local oscillator 246 and one or more filters 248. The mixer 247 may, for example, receive the composite signal from the signal combiner 230 and an RF mixing signal at frequency fRF from a local oscillator 246. The upconverter 240 may, for example, filter the upconverted signal from the mixer 247 with one or more filters 248. The output of the upconverter 240 may, for example, comprise a signal indicative of the composite signal spectrally shifted to an RF frequency. FIG. 2 shows an exemplary frequency spectrum 241 associated with the RF signal formed by the upconverter 240. The frequency spectrum 241 comprises a first portion 243 corresponding to the first signal component and a second portion 242 corresponding to the second signal component. Note that the first portion 243 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 242. Also note that the first portion 243 and

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	second portion 242 might be formed with a first mirror portion 244 and second mirror portion 245, respectively. Note that a mirror portion may either be removed or may be kept for later processing. The exemplary communication system 200 may further comprise a RF transmission stage 250 adapted to transmit an RF signal. The RF transmission stage 250 may, for example and without limitation, share any or all characteristics with the RF transmission stage 150 discussed previously. Such an RF signal may, for example, be associated with the composite signal output from the signal combiner 230 and upconverted by the upconverter 240. The RF transmission stage 250 may, for example and without limitation, comprise a power amplifier 252, antenna 254 and other components generally associated with RF signal transmission. *See, e.g.*, Rofougaran at 6:66-7:57. For example, the spectral placement module 510, optional second spectral placement module 520 and signal combiner 530 may operate in the analog domain. The first digital-to-analog converter 592 may convert the first baseband signal to the analog domain for processing by the spectral placement module 510. The second digital-to-analog converter 594 may convert the second baseband signal to the analog domain for processing by the second spectral placement module 520 or signal combiner 530. The signal combiner 530 then combines signals in the analog domain to generate an analog composite signal, which is then upconverted and transmitted by the upconverter 540 and RF transmission stage 550, respectively. *See, e.g.*, Rofougaran at 9:30-41. FIG. 7 is a diagram showing a portion of a seventh non-limiting exemplary communication system 700, in accordance with various aspects of the present invention. The exemplary communication system 700 may, for example and without limitation, share any or all characteristics with the exemplary systems 100-600 illustrated in FIGS. 1-6 and discussed previously. The exemplary communication system 700 may comprise a first mixer 744 that receives a spectrally shifted first baseband signal from the spectral placement module 710 and a first RF mixing signal (e.g., a 2.446 GHz signal generally associated with the Bluetooth communication protocol) from a

Claim 4 of the ’802 Patent	Prior Art Reference – Rofougaran
	first local oscillator 742. The exemplary communication system 700 may also comprise a second mixer 748 that receives a second baseband signal (or a spectrally shifted second baseband signal) and a second RF mixing signal (e.g., a 2.486 GHz signal generally associated with the IEEE 802.11(g) communication protocol) from a second local oscillator 746. The exemplary communication system 700 may comprise an RF signal combiner 730 that is adapted to combine input RF signals. The RF signal combiner 730 may, for example, receive and combine the output signals from the first mixer 744 and second mixer 748 to generate an RF composite signal. The exemplary communication system 700 may also comprise a RF transmission stage 750 that receives the RF composite signal from the RF signal combiner 730 and transmit the signal. *See, e.g.*, Rofougaran at 10:18-43. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 810 comprises receiving the first baseband signal, step 810 may comprise receiving the first baseband signal in any manner generally associated with receiving a baseband signal. The first baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 810 may, for example, comprise generating the first baseband signal independently (e.g., corresponding to an independent communication). Step 810 may alternatively, for example, comprise generating the first baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first baseband signal and other baseband signals for a single communication). The exemplary method 800 may, at step 820, comprise spectrally placing (or shifting) the first baseband signal (e.g., received at step 810). Step 820 may, for example and without limitation, share any or all functional characteristics with the spectral placement modules 110-710 of the exemplary systems 100-700 illustrated in FIGS. 1-7 and discussed previously.

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	Step 820 may, for example, comprise spectrally shifting the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with a second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, step 820 may comprise implementing a frequency-hopping scheme with the first baseband signal. For example, in a scenario where there are one or more frequency bands (e.g., a second frequency space) associated with a second baseband signal, step 820 may comprise spectrally shifting the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. In another non-limiting exemplary scenario, spectrally shifting the first baseband signal may result in the production of a spectral image (e.g., frequency content mirrored about a mixing frequency utilized to spectrally shift the first baseband signal). In such a scenario, step 820 may comprise accepting or rejecting the image. In a scenario where an image is rejected, step 820 may comprise rejecting the image in any of a variety of manners. For example and without limitation, step 820 may comprise performing image reject mixing to spectrally shift the first baseband signal. Such image reject mixing generally comprises spectrally shifting a signal and rejecting an image associated with the spectrally shifted signal. Also for example, step 820 may comprise filtering out an unwanted image. The scope of various aspects of the present invention should not be limited by the utilization of image rejection or by any particular manner of performing such image rejection. The exemplary method 800 may, at step 830, comprise generating and/or receiving a second baseband signal corresponding to a second communication protocol (e.g., different from the first communication protocol). Step 830 may, for example and without limitation, share any or all functional characteristics with the second input 102 of the exemplary system 100 illustrated in FIG. 1 and discussed previously.

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	The second baseband signal may, for example, correspond to a second communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 830 comprises receiving the second baseband signal, step 830 may comprise receiving the second baseband signal in any manner generally associated with receiving a baseband signal. The second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 830 may, for example, comprise generating the second baseband signal independently (e.g., corresponding to a communication independent of a communication associated with the first baseband signal). Step 830 may alternatively, for example, comprise generating the second baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the second baseband signal and the first baseband signal for a single communication). *See, e.g.*, Rofougaran at 11:53-13:4. Furthermore, this claim element is obvious in light of Rofougaran itself, when combined with any of the other references as charted for this claim element in Exs. A-1–A-31, First Supplemental Ex. A-Obviousness Chart, and/or when combined with the knowledge of one of ordinary skill in the art. Motivations to combine may come from the knowledge of the person of ordinary skill themselves, or from the known problems and predictable solutions as embodied in these references. Further motivations to combine references and additional details may be found in the Cover Pleading and First Supplemental Ex. A-Obviousness Chart.

Claim 6 of the ’802 Patent	Prior Art Reference – Rofougaran
[6.1] The method of claim 1	Rofougaran discloses all the elements of claim 1 for all the reasons provided above.
[6.2] wherein the first information corresponds to a first wireless protocol and the	Rofougaran discloses “wherein the first information corresponds to a first wireless protocol and the second information corresponds to a second wireless protocol.” See, e.g.:

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second information corresponds to a second wireless protocol.	FIG. 1 is a diagram showing a portion of a first non-limiting exemplary communication system 100, in accordance with various aspects of the present invention. The communication system (or device) may comprise characteristics of any of a variety of communication systems/devices (e.g., multimode wireless communication devices). For example and without limitation, the communication system may comprise characteristics of any of a variety of mobile wireless communication devices (e.g., cellular phones, paging devices, portable email devices, etc.). Also for example, the communication system may comprise characteristics of fixed communication systems or devices (e.g., network access points, base stations, satellites, wireless routers, set top boxes, etc.). Further for example, the communication system may comprise characteristics of a variety of electronic devices with wireless communication capability (e.g., televisions, music players, cameras, remote controls, personal digital assistants, handheld computers, gaming devices, etc.). Accordingly, the scope of various aspects of the present invention should not be limited by characteristics of particular communication systems or devices. The following discussion will, at times, refer to various communication modes. A multimode communication device may, for example, be adapted to communicate in a plurality of such communication modes. For the following discussion, a communication mode may generally be considered to coincide with communication utilizing a particular communication protocol or standard. A non-limiting list of exemplary communication protocols includes various cellular communication protocols (e.g., GSM, GPRS, EDGE, CDMA, WCDMA, TDMA, PDC, etc.), various wireless networking protocols or standards, including WLAN, WMAN, WPAN and WWAN (e.g., IEEE 802.11, Bluetooth, IEEE 802.15, UWB, IEEE 802.16, IEEE 802.20, Zigbee, any WiFi protocol, etc.), various television communication standards, etc. The scope of various aspects of the present invention should not be limited by characteristics of particular communication modes or protocols, whether standard or proprietary. The exemplary communication system 100 may comprise at least a first input 101 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to any of the previously mentioned communication protocols.

Claim 6 of the ’802 Patent	Prior Art Reference – Rofougaran
	The exemplary communication system 100 may also comprise at least a second input 102 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first communication protocol discussed above). For example and without limitation, the second baseband signal may correspond to any of the previously mentioned communication protocols. The first baseband signal and the second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of the communication system 100. For example, such modules may generate the first and second baseband signals independently (e.g., corresponding to independent respective communications). Alternatively, for example, such modules may generate the first and second baseband signals in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first and second baseband signals for a single communication). The exemplary communication system 100 may additionally comprise a spectral placement module 110 that is adapted to spectrally shift the first baseband signal (i.e., shift the frequency spectrum of the first baseband signal). In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to spectrally shift the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with the second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to implement a frequency-hopping scheme with the first baseband signal. For example, in a scenario, where there are one or more frequency bands (e.g., a second frequency space) associated with the second baseband signal, the spectral placement module 110 may be adapted to shift the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space.

Claim 6 of the '802 Patent	Prior Art Reference – Rofougaran
	See, e.g., Rofougaran at 2:38-3:58. The exemplary communication system 100 may also comprise a second spectral placement module 120. Such a second spectral placement module 120 may, for example, share any or all characteristics with the spectral placement module 110 discussed previously. The incorporation of such a second spectral placement module 120 may, for example, provide spectral shifting flexibility. For example, in such an exemplary configuration, either or both of the first and second baseband signals may be spectrally shifted to substantially distinct frequency spaces. Also for example, in such an exemplary configuration, either or both of the first and second baseband signals may be frequency hopped. Note that though the second spectral placement module 120 is illustrated separate from the first spectral placement module 110, the second spectral placement module 120 may share any or all hardware and/or software components with the spectral placement module 110. The exemplary communication system 100 may further comprise a signal combiner 130 that is adapted to generate a composite signal comprising various input signals to the signal combiner 130. For example, the composite signal may simultaneously (i.e., at an instant in time) comprise components associated with various input signals. Note that such simultaneity need not always be present. For example, at a first instant in time, the signal output from the signal combiner 130 might comprise a plurality of components associated with a plurality of respective input signals, at a second instant in time, the signal output from the signal combiner 130 might comprise a single component associated with a single respective input signal, and at a third instant in time, the signal output from the signal combiner 130 might comprise no components. In a first non-limiting exemplary scenario, the signal combiner 130 may receive a first signal that is based on the first baseband signal (e.g., associated with a first communication protocol). Also, the signal combiner 130 may receive a second signal that is based on the second baseband signal (e.g., associated with a second communication protocol). In such a scenario, the signal combiner 130 may combine the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the first baseband signal and a second signal component based on the second baseband signal. In such a scenario, for example where the frequency spectra of the first and second baseband signals do not overlap, the first and second

Claim 6 of the ’802 Patent	Prior Art Reference – Rofougaran
	baseband signals might not be spectrally shifted prior to combining by the signal combiner 130. In such a scenario, the spectral placement module 110 (and optionally, the second spectral placement module 120) may receive a control signal indicating whether or not to perform spectral shifting and/or to what degree spectral shifting should be implemented. *See, e.g.*, Rofougaran at 4:16-67. Various components of the exemplary communication system 100 (and other communication systems illustrated and discussed herein) may be implemented in analog and/or digital circuitry. To illustrate this, the exemplary communication system 100 is not shown with analog-to-digital converters (ADCs) or digital-to-analog converters (DACs). FIGS. 4-6, to be discussed later, show various non-limiting exemplary configurations including such converters. FIG. 2 is a diagram showing a portion of a second non-limiting exemplary communication system 200, in accordance with various aspects of the present invention. The communication system 200 may, for example and without limitation, share any or all characteristics with the communication system 100 illustrated in FIG. 1 and discussed previously. The exemplary communication system 200 may comprise at least a first input 201 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to the Bluetooth communication protocol. FIG. 2 shows an exemplary frequency spectrum 203 associated with the first baseband signal. The exemplary communication system 200 may also comprise at least a second input 202 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first communication protocol discussed above). For example and without limitation, the first baseband signal may correspond to an IEEE 802.11 communication protocol (e.g., IEEE 802.11(b) or IEEE

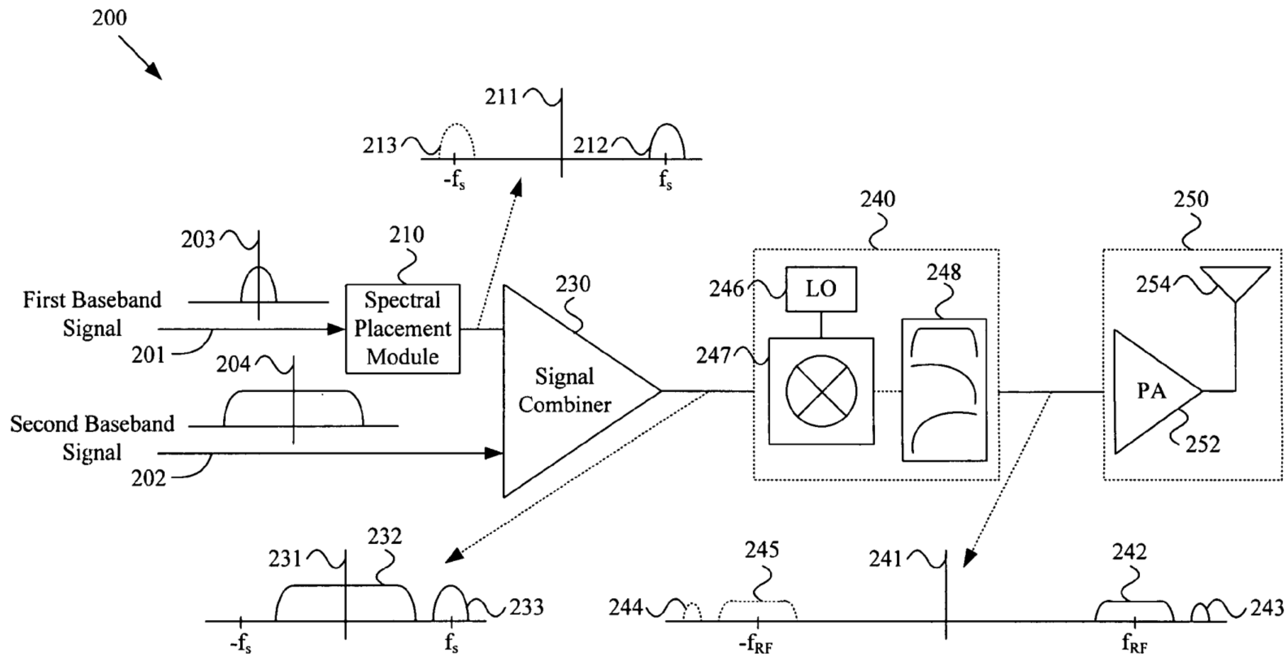
Claim 6 of the '802 Patent	Prior Art Reference – Rofougaran
	802.11(g)). FIG. 2 shows an exemplary frequency spectrum 204 associated with the second baseband signal. *See, e.g.*, Rofougaran at 5:64-6:31. In a non-limiting exemplary configuration illustrated in FIG. 2, the signal combiner 230 receives a first signal from the spectral placement module 210 that is based on the spectrally shifted first baseband signal. Also, the signal combiner 230 receives a second signal that is based on the second baseband signal. In such a configuration, the signal combiner 230 combines the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the spectrally shifted first baseband signal and a second signal component based on the second baseband signal (e.g., not spectrally shifted). FIG. 2 shows an exemplary frequency spectrum 231 associated with the composite signal formed by the signal combiner 230. The spectrum 231 comprises a first portion 233 corresponding to the first signal component, and a second portion 232 corresponding to the second signal component. Note that the first portion 233 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 232. The exemplary communication system 200 may also comprise an upconverter 240 adapted to upconvert a signal (e.g., the composite signal from the signal combiner 230) for transmission. The upconverter 240 may, for example and without limitation, share any or all characteristics with the upconverter 140 discussed previously. The upconverter 240 may, for example, comprise a mixer 247, a local oscillator 246 and one or more filters 248. The mixer 247 may, for example, receive the composite signal from the signal combiner 230 and an RF mixing signal at frequency fRF from a local oscillator 246. The upconverter 240 may, for example, filter the upconverted signal from the mixer 247 with one or more filters 248. The output of the upconverter 240 may, for example, comprise a signal indicative of the composite signal spectrally shifted to an RF frequency.

Claim 6 of the ’802 Patent	Prior Art Reference – Rofougaran
	FIG. 2 shows an exemplary frequency spectrum 241 associated with the RF signal formed by the upconverter 240. The frequency spectrum 241 comprises a first portion 243 corresponding to the first signal component and a second portion 242 corresponding to the second signal component. Note that the first portion 243 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 242. Also note that the first portion 243 and second portion 242 might be formed with a first mirror portion 244 and second mirror portion 245, respectively. Note that a mirror portion may either be removed or may be kept for later processing. The exemplary communication system 200 may further comprise a RF transmission stage 250 adapted to transmit an RF signal. The RF transmission stage 250 may, for example and without limitation, share any or all characteristics with the RF transmission stage 150 discussed previously. Such an RF signal may, for example, be associated with the composite signal output from the signal combiner 230 and upconverted by the upconverter 240. The RF transmission stage 250 may, for example and without limitation, comprise a power amplifier 252, antenna 254 and other components generally associated with RF signal transmission. *See, e.g.*, Rofougaran at 6:66-7:57. For example, the spectral placement module 510, optional second spectral placement module 520 and signal combiner 530 may operate in the analog domain. The first digital-to-analog converter 592 may convert the first baseband signal to the analog domain for processing by the spectral placement module 510. The second digital-to-analog converter 594 may convert the second baseband signal to the analog domain for processing by the second spectral placement module 520 or signal combiner 530. The signal combiner 530 then combines signals in the analog domain to generate an analog composite signal, which is then upconverted and transmitted by the upconverter 540 and RF transmission stage 550, respectively. *See, e.g.*, Rofougaran at 9:30-41. FIG. 7 is a diagram showing a portion of a seventh non-limiting exemplary communication system 700, in accordance with various aspects of the present invention. The exemplary communication

Claim 6 of the ’802 Patent	Prior Art Reference – Rofougaran
	system 700 may, for example and without limitation, share any or all characteristics with the exemplary systems 100-600 illustrated in FIGS. 1-6 and discussed previously. The exemplary communication system 700 may comprise a first mixer 744 that receives a spectrally shifted first baseband signal from the spectral placement module 710 and a first RF mixing signal (e.g., a 2.446 GHz signal generally associated with the Bluetooth communication protocol) from a first local oscillator 742. The exemplary communication system 700 may also comprise a second mixer 748 that receives a second baseband signal (or a spectrally shifted second baseband signal) and a second RF mixing signal (e.g., a 2.486 GHz signal generally associated with the IEEE 802.11(g) communication protocol) from a second local oscillator 746. The exemplary communication system 700 may comprise an RF signal combiner 730 that is adapted to combine input RF signals. The RF signal combiner 730 may, for example, receive and combine the output signals from the first mixer 744 and second mixer 748 to generate an RF composite signal. The exemplary communication system 700 may also comprise a RF transmission stage 750 that receives the RF composite signal from the RF signal combiner 730 and transmit the signal. *See, e.g.*, Rofougaran at 10:18-43. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 810 comprises receiving the first baseband signal, step 810 may comprise receiving the first baseband signal in any manner generally associated with receiving a baseband signal. The first baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 810 may, for example, comprise generating the first baseband signal independently (e.g., corresponding to an independent communication). Step 810 may alternatively, for example, comprise generating the first baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first baseband signal and other baseband signals for a single communication).

Claim 6 of the ’802 Patent	Prior Art Reference – Rofougaran
	The exemplary method 800 may, at step 820, comprise spectrally placing (or shifting) the first baseband signal (e.g., received at step 810). Step 820 may, for example and without limitation, share any or all functional characteristics with the spectral placement modules 110-710 of the exemplary systems 100-700 illustrated in FIGS. 1-7 and discussed previously. Step 820 may, for example, comprise spectrally shifting the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with a second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, step 820 may comprise implementing a frequency-hopping scheme with the first baseband signal. For example, in a scenario where there are one or more frequency bands (e.g., a second frequency space) associated with a second baseband signal, step 820 may comprise spectrally shifting the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. In another non-limiting exemplary scenario, spectrally shifting the first baseband signal may result in the production of a spectral image (e.g., frequency content mirrored about a mixing frequency utilized to spectrally shift the first baseband signal). In such a scenario, step 820 may comprise accepting or rejecting the image. In a scenario where an image is rejected, step 820 may comprise rejecting the image in any of a variety of manners. For example and without limitation, step 820 may comprise performing image reject mixing to spectrally shift the first baseband signal. Such image reject mixing generally comprises spectrally shifting a signal and rejecting an image associated with the spectrally shifted signal. Also for example, step 820 may comprise filtering out an unwanted image. The scope of various aspects of the present invention should not be limited by the utilization of image rejection or by any particular manner of performing such image rejection.

Claim 6 of the ’802 Patent	**Prior Art Reference – Rofougaran**
	The exemplary method 800 may, at step 830, comprise generating and/or receiving a second baseband signal corresponding to a second communication protocol (e.g., different from the first communication protocol). Step 830 may, for example and without limitation, share any or all functional characteristics with the second input 102 of the exemplary system 100 illustrated in FIG. 1 and discussed previously. The second baseband signal may, for example, correspond to a second communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 830 comprises receiving the second baseband signal, step 830 may comprise receiving the second baseband signal in any manner generally associated with receiving a baseband signal. The second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 830 may, for example, comprise generating the second baseband signal independently (e.g., corresponding to a communication independent of a communication associated with the first baseband signal). Step 830 may alternatively, for example, comprise generating the second baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the second baseband signal and the first baseband signal for a single communication). *See, e.g.*, Rofougaran at 11:53-13:4. Furthermore, this claim element is obvious in light of Rofougaran itself, when combined with any of the other references as charted for this claim element in Exs. A-1–A-31, First Supplemental Ex. A-Obviousness Chart, and/or when combined with the knowledge of one of ordinary skill in the art. Motivations to combine may come from the knowledge of the person of ordinary skill themselves, or from the known problems and predictable solutions as embodied in these references. Further motivations to combine references and additional details may be found in the Cover Pleading and First Supplemental Ex. A-Obviousness Chart.

Claim 7 of the '802 Patent	Prior Art Reference – Rofougaran
[7.1] The method of claim 1	Rofougaran discloses all the elements of claim 1 for all the reasons provided above.
[7.2] wherein the first information and the second information are the same data transmitted across two different frequencies.	Rofougaran discloses "wherein the first information and the second information are the same data transmitted across two different frequencies." See, e.g.:  Figure 2 *See, e.g.*, Rofougaran at Figure 2. FIG. 1 is a diagram showing a portion of a first non-limiting exemplary communication system 100, in accordance with various aspects of the present invention. The communication system (or device) may comprise characteristics of any of a variety of communication systems/devices (e.g., multimode

Claim 7 of the ’802 Patent	Prior Art Reference – Rofougaran
	wireless communication devices). For example and without limitation, the communication system may comprise characteristics of any of a variety of mobile wireless communication devices (e.g., cellular phones, paging devices, portable email devices, etc.). Also for example, the communication system may comprise characteristics of fixed communication systems or devices (e.g., network access points, base stations, satellites, wireless routers, set top boxes, etc.). Further for example, the communication system may comprise characteristics of a variety of electronic devices with wireless communication capability (e.g., televisions, music players, cameras, remote controls, personal digital assistants, handheld computers, gaming devices, etc.). Accordingly, the scope of various aspects of the present invention should not be limited by characteristics of particular communication systems or devices. The following discussion will, at times, refer to various communication modes. A multimode communication device may, for example, be adapted to communicate in a plurality of such communication modes. For the following discussion, a communication mode may generally be considered to coincide with communication utilizing a particular communication protocol or standard. A non-limiting list of exemplary communication protocols includes various cellular communication protocols (e.g., GSM, GPRS, EDGE, CDMA, WCDMA, TDMA, PDC, etc.), various wireless networking protocols or standards, including WLAN, WMAN, WPAN and WWAN (e.g., IEEE 802.11, Bluetooth, IEEE 802.15, UWB, IEEE 802.16, IEEE 802.20, Zigbee, any WiFi protocol, etc.), various television communication standards, etc. The scope of various aspects of the present invention should not be limited by characteristics of particular communication modes or protocols, whether standard or proprietary. The exemplary communication system 100 may comprise at least a first input 101 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to any of the previously mentioned communication protocols. The exemplary communication system 100 may also comprise at least a second input 102 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a

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	second communication protocol (e.g., a second communication protocol different from the first communication protocol discussed above). For example and without limitation, the second baseband signal may correspond to any of the previously mentioned communication protocols. The first baseband signal and the second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of the communication system 100. For example, such modules may generate the first and second baseband signals independently (e.g., corresponding to independent respective communications). Alternatively, for example, such modules may generate the first and second baseband signals in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first and second baseband signals for a single communication). The exemplary communication system 100 may additionally comprise a spectral placement module 110 that is adapted to spectrally shift the first baseband signal (i.e., shift the frequency spectrum of the first baseband signal). In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to spectrally shift the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with the second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to implement a frequency-hopping scheme with the first baseband signal. For example, in a scenario, where there are one or more frequency bands (e.g., a second frequency space) associated with the second baseband signal, the spectral placement module 110 may be adapted to shift the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. *See*, *e.g.*, Rofougaran at 2:38-3:58.

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	The exemplary communication system 100 may also comprise a second spectral placement module 120. Such a second spectral placement module 120 may, for example, share any or all characteristics with the spectral placement module 110 discussed previously. The incorporation of such a second spectral placement module 120 may, for example, provide spectral shifting flexibility. For example, in such an exemplary configuration, either or both of the first and second baseband signals may be spectrally shifted to substantially distinct frequency spaces. Also for example, in such an exemplary configuration, either or both of the first and second baseband signals may be frequency hopped. Note that though the second spectral placement module 120 is illustrated separate from the first spectral placement module 110, the second spectral placement module 120 may share any or all hardware and/or software components with the spectral placement module 110. The exemplary communication system 100 may further comprise a signal combiner 130 that is adapted to generate a composite signal comprising various input signals to the signal combiner 130. For example, the composite signal may simultaneously (i.e., at an instant in time) comprise components associated with various input signals. Note that such simultaneity need not always be present. For example, at a first instant in time, the signal output from the signal combiner 130 might comprise a plurality of components associated with a plurality of respective input signals, at a second instant in time, the signal output from the signal combiner 130 might comprise a single component associated with a single respective input signal, and at a third instant in time, the signal output from the signal combiner 130 might comprise no components. In a first non-limiting exemplary scenario, the signal combiner 130 may receive a first signal that is based on the first baseband signal (e.g., associated with a first communication protocol). Also, the signal combiner 130 may receive a second signal that is based on the second baseband signal (e.g., associated with a second communication protocol). In such a scenario, the signal combiner 130 may combine the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the first baseband signal and a second signal component based on the second baseband signal. In such a scenario, for example where the frequency spectra of the first and second baseband signals do not overlap, the first and second baseband signals might not be spectrally shifted prior to combining by the signal combiner 130. In such a scenario, the spectral placement module 110 (and optionally, the second spectral placement

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	module 120) may receive a control signal indicating whether or not to perform spectral shifting and/or to what degree spectral shifting should be implemented. *See, e.g.*, Rofougaran at 4:16-67. Various components of the exemplary communication system 100 (and other communication systems illustrated and discussed herein) may be implemented in analog and/or digital circuitry. To illustrate this, the exemplary communication system 100 is not shown with analog-to-digital converters (ADCs) or digital-to-analog converters (DACs). FIGS. 4-6, to be discussed later, show various non-limiting exemplary configurations including such converters. FIG. 2 is a diagram showing a portion of a second non-limiting exemplary communication system 200, in accordance with various aspects of the present invention. The communication system 200 may, for example and without limitation, share any or all characteristics with the communication system 100 illustrated in FIG. 1 and discussed previously. The exemplary communication system 200 may comprise at least a first input 201 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to the Bluetooth communication protocol. FIG. 2 shows an exemplary frequency spectrum 203 associated with the first baseband signal. The exemplary communication system 200 may also comprise at least a second input 202 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first communication protocol discussed above). For example and without limitation, the first baseband signal may correspond to an IEEE 802.11 communication protocol (e.g., IEEE 802.11(b) or IEEE 802.11(g)). FIG. 2 shows an exemplary frequency spectrum 204 associated with the second baseband signal.

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	See, e.g., Rofougaran at 5:64-6:31. In a non-limiting exemplary configuration illustrated in FIG. 2, the signal combiner 230 receives a first signal from the spectral placement module 210 that is based on the spectrally shifted first baseband signal. Also, the signal combiner 230 receives a second signal that is based on the second baseband signal. In such a configuration, the signal combiner 230 combines the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the spectrally shifted first baseband signal and a second signal component based on the second baseband signal (e.g., not spectrally shifted). FIG. 2 shows an exemplary frequency spectrum 231 associated with the composite signal formed by the signal combiner 230. The spectrum 231 comprises a first portion 233 corresponding to the first signal component, and a second portion 232 corresponding to the second signal component. Note that the first portion 233 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 232. The exemplary communication system 200 may also comprise an upconverter 240 adapted to upconvert a signal (e.g., the composite signal from the signal combiner 230) for transmission. The upconverter 240 may, for example and without limitation, share any or all characteristics with the upconverter 140 discussed previously. The upconverter 240 may, for example, comprise a mixer 247, a local oscillator 246 and one or more filters 248. The mixer 247 may, for example, receive the composite signal from the signal combiner 230 and an RF mixing signal at frequency fRF from a local oscillator 246. The upconverter 240 may, for example, filter the upconverted signal from the mixer 247 with one or more filters 248. The output of the upconverter 240 may, for example, comprise a signal indicative of the composite signal spectrally shifted to an RF frequency. FIG. 2 shows an exemplary frequency spectrum 241 associated with the RF signal formed by the upconverter 240. The frequency spectrum 241 comprises a first portion 243 corresponding to the first signal component and a second portion 242 corresponding to the second signal component. Note that

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	the first portion 243 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 242. Also note that the first portion 243 and second portion 242 might be formed with a first mirror portion 244 and second mirror portion 245, respectively. Note that a mirror portion may either be removed or may be kept for later processing. The exemplary communication system 200 may further comprise a RF transmission stage 250 adapted to transmit an RF signal. The RF transmission stage 250 may, for example and without limitation, share any or all characteristics with the RF transmission stage 150 discussed previously. Such an RF signal may, for example, be associated with the composite signal output from the signal combiner 230 and upconverted by the upconverter 240. The RF transmission stage 250 may, for example and without limitation, comprise a power amplifier 252, antenna 254 and other components generally associated with RF signal transmission. *See, e.g.*, Rofougaran at 6:66-7:57. For example, the spectral placement module 510, optional second spectral placement module 520 and signal combiner 530 may operate in the analog domain. The first digital-to-analog converter 592 may convert the first baseband signal to the analog domain for processing by the spectral placement module 510. The second digital-to-analog converter 594 may convert the second baseband signal to the analog domain for processing by the second spectral placement module 520 or signal combiner 530. The signal combiner 530 then combines signals in the analog domain to generate an analog composite signal, which is then upconverted and transmitted by the upconverter 540 and RF transmission stage 550, respectively. *See, e.g.*, Rofougaran at 9:30-41. FIG. 7 is a diagram showing a portion of a seventh non-limiting exemplary communication system 700, in accordance with various aspects of the present invention. The exemplary communication system 700 may, for example and without limitation, share any or all characteristics with the exemplary systems 100-600 illustrated in FIGS. 1-6 and discussed previously.

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	The exemplary communication system 700 may comprise a first mixer 744 that receives a spectrally shifted first baseband signal from the spectral placement module 710 and a first RF mixing signal (e.g., a 2.446 GHz signal generally associated with the Bluetooth communication protocol) from a first local oscillator 742. The exemplary communication system 700 may also comprise a second mixer 748 that receives a second baseband signal (or a spectrally shifted second baseband signal) and a second RF mixing signal (e.g., a 2.486 GHz signal generally associated with the IEEE 802.11(g) communication protocol) from a second local oscillator 746. The exemplary communication system 700 may comprise an RF signal combiner 730 that is adapted to combine input RF signals. The RF signal combiner 730 may, for example, receive and combine the output signals from the first mixer 744 and second mixer 748 to generate an RF composite signal. The exemplary communication system 700 may also comprise a RF transmission stage 750 that receives the RF composite signal from the RF signal combiner 730 and transmit the signal. *See, e.g.*, Rofougaran at 10:18-43. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 810 comprises receiving the first baseband signal, step 810 may comprise receiving the first baseband signal in any manner generally associated with receiving a baseband signal. The first baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 810 may, for example, comprise generating the first baseband signal independently (e.g., corresponding to an independent communication). Step 810 may alternatively, for example, comprise generating the first baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first baseband signal and other baseband signals for a single communication). The exemplary method 800 may, at step 820, comprise spectrally placing (or shifting) the first baseband signal (e.g., received at step 810). Step 820 may, for example and without limitation, share

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	any or all functional characteristics with the spectral placement modules 110-710 of the exemplary systems 100-700 illustrated in FIGS. 1-7 and discussed previously. Step 820 may, for example, comprise spectrally shifting the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with a second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, step 820 may comprise implementing a frequency-hopping scheme with the first baseband signal. For example, in a scenario where there are one or more frequency bands (e.g., a second frequency space) associated with a second baseband signal, step 820 may comprise spectrally shifting the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. In another non-limiting exemplary scenario, spectrally shifting the first baseband signal may result in the production of a spectral image (e.g., frequency content mirrored about a mixing frequency utilized to spectrally shift the first baseband signal). In such a scenario, step 820 may comprise accepting or rejecting the image. In a scenario where an image is rejected, step 820 may comprise rejecting the image in any of a variety of manners. For example and without limitation, step 820 may comprise performing image reject mixing to spectrally shift the first baseband signal. Such image reject mixing generally comprises spectrally shifting a signal and rejecting an image associated with the spectrally shifted signal. Also for example, step 820 may comprise filtering out an unwanted image. The scope of various aspects of the present invention should not be limited by the utilization of image rejection or by any particular manner of performing such image rejection. The exemplary method 800 may, at step 830, comprise generating and/or receiving a second baseband signal corresponding to a second communication protocol (e.g., different from the first

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	communication protocol). Step 830 may, for example and without limitation, share any or all functional characteristics with the second input 102 of the exemplary system 100 illustrated in FIG. 1 and discussed previously. The second baseband signal may, for example, correspond to a second communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 830 comprises receiving the second baseband signal, step 830 may comprise receiving the second baseband signal in any manner generally associated with receiving a baseband signal. The second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 830 may, for example, comprise generating the second baseband signal independently (e.g., corresponding to a communication independent of a communication associated with the first baseband signal). Step 830 may alternatively, for example, comprise generating the second baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the second baseband signal and the first baseband signal for a single communication). *See, e.g.*, Rofougaran at 11:53-13:4. Furthermore, this claim element is obvious in light of Rofougaran itself, when combined with any of the other references as charted for this claim element in Exs. A-1–A-31, First Supplemental Ex. A-Obviousness Chart, and/or when combined with the knowledge of one of ordinary skill in the art. Motivations to combine may come from the knowledge of the person of ordinary skill themselves, or from the known problems and predictable solutions as embodied in these references. Further motivations to combine references and additional details may be found in the Cover Pleading and First Supplemental Ex. A-Obviousness Chart.

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[8.1] The method of claim 1	Rofougaran discloses all the elements of claim 1 for all the reasons provided above.

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[8.2] wherein the first information and the second information are from the same data stream.	Rofougaran discloses "wherein the first information and the second information are from the same data stream." See, e.g.: FIG. 1 is a diagram showing a portion of a first non-limiting exemplary communication system 100, in accordance with various aspects of the present invention. The communication system (or device) may comprise characteristics of any of a variety of communication systems/devices (e.g., multimode wireless communication devices). For example and without limitation, the communication system may comprise characteristics of any of a variety of mobile wireless communication devices (e.g., cellular phones, paging devices, portable email devices, etc.). Also for example, the communication system may comprise characteristics of fixed communication systems or devices (e.g., network access points, base stations, satellites, wireless routers, set top boxes, etc.). Further for example, the communication system may comprise characteristics of a variety of electronic devices with wireless communication capability (e.g., televisions, music players, cameras, remote controls, personal digital assistants, handheld computers, gaming devices, etc.). Accordingly, the scope of various aspects of the present invention should not be limited by characteristics of particular communication systems or devices. The following discussion will, at times, refer to various communication modes. A multimode communication device may, for example, be adapted to communicate in a plurality of such communication modes. For the following discussion, a communication mode may generally be considered to coincide with communication utilizing a particular communication protocol or standard. A non-limiting list of exemplary communication protocols includes various cellular communication protocols (e.g., GSM, GPRS, EDGE, CDMA, WCDMA, TDMA, PDC, etc.), various wireless networking protocols or standards, including WLAN, WMAN, WPAN and WWAN (e.g., IEEE 802.11, Bluetooth, IEEE 802.15, UWB, IEEE 802.16, IEEE 802.20, Zigbee, any WiFi protocol, etc.), various television communication standards, etc. The scope of various aspects of the present invention should not be limited by characteristics of particular communication modes or protocols, whether standard or proprietary. The exemplary communication system 100 may comprise at least a first input 101 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first

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	communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to any of the previously mentioned communication protocols. The exemplary communication system 100 may also comprise at least a second input 102 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first communication protocol discussed above). For example and without limitation, the second baseband signal may correspond to any of the previously mentioned communication protocols. The first baseband signal and the second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of the communication system 100. For example, such modules may generate the first and second baseband signals independently (e.g., corresponding to independent respective communications). Alternatively, for example, such modules may generate the first and second baseband signals in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first and second baseband signals for a single communication). The exemplary communication system 100 may additionally comprise a spectral placement module 110 that is adapted to spectrally shift the first baseband signal (i.e., shift the frequency spectrum of the first baseband signal). In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to spectrally shift the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with the second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to implement a frequency-hopping scheme with the first baseband signal. For example, in a scenario, where there are one or more frequency bands (e.g., a second frequency space) associated with the second baseband signal, the spectral placement module 110 may be adapted to shift the first baseband

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	signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. *See, e.g.*, Rofougaran at 2:38-3:58. The exemplary communication system 100 may also comprise a second spectral placement module 120. Such a second spectral placement module 120 may, for example, share any or all characteristics with the spectral placement module 110 discussed previously. The incorporation of such a second spectral placement module 120 may, for example, provide spectral shifting flexibility. For example, in such an exemplary configuration, either or both of the first and second baseband signals may be spectrally shifted to substantially distinct frequency spaces. Also for example, in such an exemplary configuration, either or both of the first and second baseband signals may be frequency hopped. Note that though the second spectral placement module 120 is illustrated separate from the first spectral placement module 110, the second spectral placement module 120 may share any or all hardware and/or software components with the spectral placement module 110. The exemplary communication system 100 may further comprise a signal combiner 130 that is adapted to generate a composite signal comprising various input signals to the signal combiner 130. For example, the composite signal may simultaneously (i.e., at an instant in time) comprise components associated with various input signals. Note that such simultaneity need not always be present. For example, at a first instant in time, the signal output from the signal combiner 130 might comprise a plurality of components associated with a plurality of respective input signals, at a second instant in time, the signal output from the signal combiner 130 might comprise a single component associated with a single respective input signal, and at a third instant in time, the signal output from the signal combiner 130 might comprise no components. In a first non-limiting exemplary scenario, the signal combiner 130 may receive a first signal that is based on the first baseband signal (e.g., associated with a first communication protocol). Also, the signal combiner 130 may receive a second signal that is based on the second baseband signal (e.g., associated with a second communication protocol). In such a scenario, the signal combiner 130 may combine the first and second signals to generate a composite signal, where the composite signal

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	simultaneously comprises a first signal component based on the first baseband signal and a second signal component based on the second baseband signal. In such a scenario, for example where the frequency spectra of the first and second baseband signals do not overlap, the first and second baseband signals might not be spectrally shifted prior to combining by the signal combiner 130. In such a scenario, the spectral placement module 110 (and optionally, the second spectral placement module 120) may receive a control signal indicating whether or not to perform spectral shifting and/or to what degree spectral shifting should be implemented. *See*, *e.g.*, Rofougaran at 4:16-67. Various components of the exemplary communication system 100 (and other communication systems illustrated and discussed herein) may be implemented in analog and/or digital circuitry. To illustrate this, the exemplary communication system 100 is not shown with analog-to-digital converters (ADCs) or digital-to-analog converters (DACs). FIGS. 4-6, to be discussed later, show various non-limiting exemplary configurations including such converters. FIG. 2 is a diagram showing a portion of a second non-limiting exemplary communication system 200, in accordance with various aspects of the present invention. The communication system 200 may, for example and without limitation, share any or all characteristics with the communication system 100 illustrated in FIG. 1 and discussed previously. The exemplary communication system 200 may comprise at least a first input 201 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to the Bluetooth communication protocol. FIG. 2 shows an exemplary frequency spectrum 203 associated with the first baseband signal. The exemplary communication system 200 may also comprise at least a second input 202 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first

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	communication protocol discussed above). For example and without limitation, the first baseband signal may correspond to an IEEE 802.11 communication protocol (e.g., IEEE 802.11(b) or IEEE 802.11(g)). FIG. 2 shows an exemplary frequency spectrum 204 associated with the second baseband signal. *See, e.g.*, Rofougaran at 5:64-6:31. In a non-limiting exemplary configuration illustrated in FIG. 2, the signal combiner 230 receives a first signal from the spectral placement module 210 that is based on the spectrally shifted first baseband signal. Also, the signal combiner 230 receives a second signal that is based on the second baseband signal. In such a configuration, the signal combiner 230 combines the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the spectrally shifted first baseband signal and a second signal component based on the second baseband signal (e.g., not spectrally shifted). FIG. 2 shows an exemplary frequency spectrum 231 associated with the composite signal formed by the signal combiner 230. The spectrum 231 comprises a first portion 233 corresponding to the first signal component, and a second portion 232 corresponding to the second signal component. Note that the first portion 233 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 232. The exemplary communication system 200 may also comprise an upconverter 240 adapted to upconvert a signal (e.g., the composite signal from the signal combiner 230) for transmission. The upconverter 240 may, for example and without limitation, share any or all characteristics with the upconverter 140 discussed previously. The upconverter 240 may, for example, comprise a mixer 247, a local oscillator 246 and one or more filters 248. The mixer 247 may, for example, receive the composite signal from the signal combiner 230 and an RF mixing signal at frequency fRF from a local oscillator 246. The upconverter 240 may, for example, filter the upconverted signal from the mixer 247 with one or more filters 248. The

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	output of the upconverter 240 may, for example, comprise a signal indicative of the composite signal spectrally shifted to an RF frequency. FIG. 2 shows an exemplary frequency spectrum 241 associated with the RF signal formed by the upconverter 240. The frequency spectrum 241 comprises a first portion 243 corresponding to the first signal component and a second portion 242 corresponding to the second signal component. Note that the first portion 243 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 242. Also note that the first portion 243 and second portion 242 might be formed with a first mirror portion 244 and second mirror portion 245, respectively. Note that a mirror portion may either be removed or may be kept for later processing. The exemplary communication system 200 may further comprise a RF transmission stage 250 adapted to transmit an RF signal. The RF transmission stage 250 may, for example and without limitation, share any or all characteristics with the RF transmission stage 150 discussed previously. Such an RF signal may, for example, be associated with the composite signal output from the signal combiner 230 and upconverted by the upconverter 240. The RF transmission stage 250 may, for example and without limitation, comprise a power amplifier 252, antenna 254 and other components generally associated with RF signal transmission. *See, e.g.*, Rofougaran at 6:66-7:57. For example, the spectral placement module 510, optional second spectral placement module 520 and signal combiner 530 may operate in the analog domain. The first digital-to-analog converter 592 may convert the first baseband signal to the analog domain for processing by the spectral placement module 510. The second digital-to-analog converter 594 may convert the second baseband signal to the analog domain for processing by the second spectral placement module 520 or signal combiner 530. The signal combiner 530 then combines signals in the analog domain to generate an analog composite signal, which is then upconverted and transmitted by the upconverter 540 and RF transmission stage 550, respectively. *See, e.g.*, Rofougaran at 9:30-41.

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	FIG. 7 is a diagram showing a portion of a seventh non-limiting exemplary communication system 700, in accordance with various aspects of the present invention. The exemplary communication system 700 may, for example and without limitation, share any or all characteristics with the exemplary systems 100-600 illustrated in FIGS. 1-6 and discussed previously. The exemplary communication system 700 may comprise a first mixer 744 that receives a spectrally shifted first baseband signal from the spectral placement module 710 and a first RF mixing signal (e.g., a 2.446 GHz signal generally associated with the Bluetooth communication protocol) from a first local oscillator 742. The exemplary communication system 700 may also comprise a second mixer 748 that receives a second baseband signal (or a spectrally shifted second baseband signal) and a second RF mixing signal (e.g., a 2.486 GHz signal generally associated with the IEEE 802.11(g) communication protocol) from a second local oscillator 746. The exemplary communication system 700 may comprise an RF signal combiner 730 that is adapted to combine input RF signals. The RF signal combiner 730 may, for example, receive and combine the output signals from the first mixer 744 and second mixer 748 to generate an RF composite signal. The exemplary communication system 700 may also comprise a RF transmission stage 750 that receives the RF composite signal from the RF signal combiner 730 and transmit the signal. *See, e.g.*, Rofougaran at 10:18-43. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 810 comprises receiving the first baseband signal, step 810 may comprise receiving the first baseband signal in any manner generally associated with receiving a baseband signal. The first baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 810 may, for example, comprise generating the first baseband signal independently (e.g., corresponding to an independent communication). Step 810 may alternatively, for example, comprise generating the first baseband signal in a dependent manner (e.g., coordinating independent respective

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	communications or utilizing both the first baseband signal and other baseband signals for a single communication). The exemplary method 800 may, at step 820, comprise spectrally placing (or shifting) the first baseband signal (e.g., received at step 810). Step 820 may, for example and without limitation, share any or all functional characteristics with the spectral placement modules 110-710 of the exemplary systems 100-700 illustrated in FIGS. 1-7 and discussed previously. Step 820 may, for example, comprise spectrally shifting the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with a second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, step 820 may comprise implementing a frequency-hopping scheme with the first baseband signal. For example, in a scenario where there are one or more frequency bands (e.g., a second frequency space) associated with a second baseband signal, step 820 may comprise spectrally shifting the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. In another non-limiting exemplary scenario, spectrally shifting the first baseband signal may result in the production of a spectral image (e.g., frequency content mirrored about a mixing frequency utilized to spectrally shift the first baseband signal). In such a scenario, step 820 may comprise accepting or rejecting the image. In a scenario where an image is rejected, step 820 may comprise rejecting the image in any of a variety of manners. For example and without limitation, step 820 may comprise performing image reject mixing to spectrally shift the first baseband signal. Such image reject mixing generally comprises spectrally shifting a signal and rejecting an image associated with the spectrally shifted signal. Also for example, step 820 may comprise filtering out an unwanted image. The scope of

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	various aspects of the present invention should not be limited by the utilization of image rejection or by any particular manner of performing such image rejection. The exemplary method 800 may, at step 830, comprise generating and/or receiving a second baseband signal corresponding to a second communication protocol (e.g., different from the first communication protocol). Step 830 may, for example and without limitation, share any or all functional characteristics with the second input 102 of the exemplary system 100 illustrated in FIG. 1 and discussed previously. The second baseband signal may, for example, correspond to a second communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 830 comprises receiving the second baseband signal, step 830 may comprise receiving the second baseband signal in any manner generally associated with receiving a baseband signal. The second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 830 may, for example, comprise generating the second baseband signal independently (e.g., corresponding to a communication independent of a communication associated with the first baseband signal). Step 830 may alternatively, for example, comprise generating the second baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the second baseband signal and the first baseband signal for a single communication). *See, e.g.*, Rofougaran at 11:53-13:4. Furthermore, this claim element is obvious in light of Rofougaran itself, when combined with any of the other references as charted for this claim element in Exs. A-1–A-31, First Supplemental Ex. A-Obviousness Chart, and/or when combined with the knowledge of one of ordinary skill in the art. Motivations to combine may come from the knowledge of the person of ordinary skill themselves, or from the known problems and predictable solutions as embodied in these references. Further motivations to combine references and additional details may be found in the Cover Pleading and First Supplemental Ex. A-Obviousness Chart.

Claim 9 of the '802 Patent	Prior Art Reference – Rofougaran
[9.1] The method of claim 1	Rofougaran discloses all the elements of claim 1 for all the reasons provided above.
[9.2] wherein first information and second information comprise a plurality of OFDM symbols, wherein a first symbol is transmitted during a first time slot across the first frequency range and a second symbol is transmitted during the first time slot across the second frequency range, and wherein a third symbol is transmitted during a second time slot across the first frequency range and a fourth symbol is transmitted during the second time slot across a second frequency range.	Rofougaran discloses "wherein first information and second information comprise a plurality of OFDM symbols, wherein a first symbol is transmitted during a first time slot across the first frequency range and a second symbol is transmitted during the first time slot across the second frequency range, and wherein a third symbol is transmitted during a second time slot across the first frequency range and a fourth symbol is transmitted during the second time slot across a second frequency range." See, e.g.: FIG. 1 is a diagram showing a portion of a first non-limiting exemplary communication system 100, in accordance with various aspects of the present invention. The communication system (or device) may comprise characteristics of any of a variety of communication systems/devices (e.g., multimode wireless communication devices). For example and without limitation, the communication system may comprise characteristics of any of a variety of mobile wireless communication devices (e.g., cellular phones, paging devices, portable email devices, etc.). Also for example, the communication system may comprise characteristics of fixed communication systems or devices (e.g., network access points, base stations, satellites, wireless routers, set top boxes, etc.). Further for example, the communication system may comprise characteristics of a variety of electronic devices with wireless communication capability (e.g., televisions, music players, cameras, remote controls, personal digital assistants, handheld computers, gaming devices, etc.). Accordingly, the scope of various aspects of the present invention should not be limited by characteristics of particular communication systems or devices. The following discussion will, at times, refer to various communication modes. A multimode communication device may, for example, be adapted to communicate in a plurality of such communication modes. For the following discussion, a communication mode may generally be considered to coincide with communication utilizing a particular communication protocol or standard. A non-limiting list of exemplary communication protocols includes various cellular communication protocols (e.g., GSM, GPRS, EDGE, CDMA, WCDMA, TDMA, PDC, etc.), various wireless networking protocols or standards, including WLAN, WMAN, WPAN and WWAN (e.g.,

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	IEEE 802.11, Bluetooth, IEEE 802.15, UWB, IEEE 802.16, IEEE 802.20, Zigbee, any WiFi protocol, etc.), various television communication standards, etc. The scope of various aspects of the present invention should not be limited by characteristics of particular communication modes or protocols, whether standard or proprietary. The exemplary communication system 100 may comprise at least a first input 101 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to any of the previously mentioned communication protocols. The exemplary communication system 100 may also comprise at least a second input 102 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first communication protocol discussed above). For example and without limitation, the second baseband signal may correspond to any of the previously mentioned communication protocols. The first baseband signal and the second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of the communication system 100. For example, such modules may generate the first and second baseband signals independently (e.g., corresponding to independent respective communications). Alternatively, for example, such modules may generate the first and second baseband signals in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first and second baseband signals for a single communication). The exemplary communication system 100 may additionally comprise a spectral placement module 110 that is adapted to spectrally shift the first baseband signal (i.e., shift the frequency spectrum of the first baseband signal). In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to spectrally shift the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with the second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the

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	second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to implement a frequency-hopping scheme with the first baseband signal. For example, in a scenario, where there are one or more frequency bands (e.g., a second frequency space) associated with the second baseband signal, the spectral placement module 110 may be adapted to shift the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. *See, e.g.*, Rofougaran at 2:38-3:58. The exemplary communication system 100 may also comprise a second spectral placement module 120. Such a second spectral placement module 120 may, for example, share any or all characteristics with the spectral placement module 110 discussed previously. The incorporation of such a second spectral placement module 120 may, for example, provide spectral shifting flexibility. For example, in such an exemplary configuration, either or both of the first and second baseband signals may be spectrally shifted to substantially distinct frequency spaces. Also for example, in such an exemplary configuration, either or both of the first and second baseband signals may be frequency hopped. Note that though the second spectral placement module 120 is illustrated separate from the first spectral placement module 110, the second spectral placement module 120 may share any or all hardware and/or software components with the spectral placement module 110. The exemplary communication system 100 may further comprise a signal combiner 130 that is adapted to generate a composite signal comprising various input signals to the signal combiner 130. For example, the composite signal may simultaneously (i.e., at an instant in time) comprise components associated with various input signals. Note that such simultaneity need not always be present. For example, at a first instant in time, the signal output from the signal combiner 130 might comprise a plurality of components associated with a plurality of respective input signals, at a second instant in time, the signal output from the signal combiner 130 might comprise a single component

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	associated with a single respective input signal, and at a third instant in time, the signal output from the signal combiner 130 might comprise no components. In a first non-limiting exemplary scenario, the signal combiner 130 may receive a first signal that is based on the first baseband signal (e.g., associated with a first communication protocol). Also, the signal combiner 130 may receive a second signal that is based on the second baseband signal (e.g., associated with a second communication protocol). In such a scenario, the signal combiner 130 may combine the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the first baseband signal and a second signal component based on the second baseband signal. In such a scenario, for example where the frequency spectra of the first and second baseband signals do not overlap, the first and second baseband signals might not be spectrally shifted prior to combining by the signal combiner 130. In such a scenario, the spectral placement module 110 (and optionally, the second spectral placement module 120) may receive a control signal indicating whether or not to perform spectral shifting and/or to what degree spectral shifting should be implemented. *See, e.g.*, Rofougaran at 4:16-67. Various components of the exemplary communication system 100 (and other communication systems illustrated and discussed herein) may be implemented in analog and/or digital circuitry. To illustrate this, the exemplary communication system 100 is not shown with analog-to-digital converters (ADCs) or digital-to-analog converters (DACs). FIGS. 4-6, to be discussed later, show various non-limiting exemplary configurations including such converters. FIG. 2 is a diagram showing a portion of a second non-limiting exemplary communication system 200, in accordance with various aspects of the present invention. The communication system 200 may, for example and without limitation, share any or all characteristics with the communication system 100 illustrated in FIG. 1 and discussed previously. The exemplary communication system 200 may comprise at least a first input 201 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first

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	communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to the Bluetooth communication protocol. FIG. 2 shows an exemplary frequency spectrum 203 associated with the first baseband signal. The exemplary communication system 200 may also comprise at least a second input 202 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first communication protocol discussed above). For example and without limitation, the first baseband signal may correspond to an IEEE 802.11 communication protocol (e.g., IEEE 802.11(b) or IEEE 802.11(g)). FIG. 2 shows an exemplary frequency spectrum 204 associated with the second baseband signal. *See, e.g.*, Rofougaran at 5:64-6:31. In a non-limiting exemplary configuration illustrated in FIG. 2, the signal combiner 230 receives a first signal from the spectral placement module 210 that is based on the spectrally shifted first baseband signal. Also, the signal combiner 230 receives a second signal that is based on the second baseband signal. In such a configuration, the signal combiner 230 combines the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the spectrally shifted first baseband signal and a second signal component based on the second baseband signal (e.g., not spectrally shifted). FIG. 2 shows an exemplary frequency spectrum 231 associated with the composite signal formed by the signal combiner 230. The spectrum 231 comprises a first portion 233 corresponding to the first signal component, and a second portion 232 corresponding to the second signal component. Note that the first portion 233 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 232. The exemplary communication system 200 may also comprise an upconverter 240 adapted to upconvert a signal (e.g., the composite signal from the signal combiner 230) for transmission. The

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	upconverter 240 may, for example and without limitation, share any or all characteristics with the upconverter 140 discussed previously. The upconverter 240 may, for example, comprise a mixer 247, a local oscillator 246 and one or more filters 248. The mixer 247 may, for example, receive the composite signal from the signal combiner 230 and an RF mixing signal at frequency fRF from a local oscillator 246. The upconverter 240 may, for example, filter the upconverted signal from the mixer 247 with one or more filters 248. The output of the upconverter 240 may, for example, comprise a signal indicative of the composite signal spectrally shifted to an RF frequency. FIG. 2 shows an exemplary frequency spectrum 241 associated with the RF signal formed by the upconverter 240. The frequency spectrum 241 comprises a first portion 243 corresponding to the first signal component and a second portion 242 corresponding to the second signal component. Note that the first portion 243 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 242. Also note that the first portion 243 and second portion 242 might be formed with a first mirror portion 244 and second mirror portion 245, respectively. Note that a mirror portion may either be removed or may be kept for later processing. The exemplary communication system 200 may further comprise a RF transmission stage 250 adapted to transmit an RF signal. The RF transmission stage 250 may, for example and without limitation, share any or all characteristics with the RF transmission stage 150 discussed previously. Such an RF signal may, for example, be associated with the composite signal output from the signal combiner 230 and upconverted by the upconverter 240. The RF transmission stage 250 may, for example and without limitation, comprise a power amplifier 252, antenna 254 and other components generally associated with RF signal transmission. *See, e.g.*, Rofougaran at 6:66-7:57. For example, the spectral placement module 510, optional second spectral placement module 520 and signal combiner 530 may operate in the analog domain. The first digital-to-analog converter 592 may convert the first baseband signal to the analog domain for processing by the spectral placement module 510. The second digital-to-analog converter 594 may convert the second baseband signal to

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	the analog domain for processing by the second spectral placement module 520 or signal combiner 530. The signal combiner 530 then combines signals in the analog domain to generate an analog composite signal, which is then upconverted and transmitted by the upconverter 540 and RF transmission stage 550, respectively. *See, e.g.*, Rofougaran at 9:30-41. FIG. 7 is a diagram showing a portion of a seventh non-limiting exemplary communication system 700, in accordance with various aspects of the present invention. The exemplary communication system 700 may, for example and without limitation, share any or all characteristics with the exemplary systems 100-600 illustrated in FIGS. 1-6 and discussed previously. The exemplary communication system 700 may comprise a first mixer 744 that receives a spectrally shifted first baseband signal from the spectral placement module 710 and a first RF mixing signal (e.g., a 2.446 GHz signal generally associated with the Bluetooth communication protocol) from a first local oscillator 742. The exemplary communication system 700 may also comprise a second mixer 748 that receives a second baseband signal (or a spectrally shifted second baseband signal) and a second RF mixing signal (e.g., a 2.486 GHz signal generally associated with the IEEE 802.11(g) communication protocol) from a second local oscillator 746. The exemplary communication system 700 may comprise an RF signal combiner 730 that is adapted to combine input RF signals. The RF signal combiner 730 may, for example, receive and combine the output signals from the first mixer 744 and second mixer 748 to generate an RF composite signal. The exemplary communication system 700 may also comprise a RF transmission stage 750 that receives the RF composite signal from the RF signal combiner 730 and transmit the signal. *See, e.g.*, Rofougaran at 10:18-43. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where

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	step 810 comprises receiving the first baseband signal, step 810 may comprise receiving the first baseband signal in any manner generally associated with receiving a baseband signal. The first baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 810 may, for example, comprise generating the first baseband signal independently (e.g., corresponding to an independent communication). Step 810 may alternatively, for example, comprise generating the first baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first baseband signal and other baseband signals for a single communication). The exemplary method 800 may, at step 820, comprise spectrally placing (or shifting) the first baseband signal (e.g., received at step 810). Step 820 may, for example and without limitation, share any or all functional characteristics with the spectral placement modules 110-710 of the exemplary systems 100-700 illustrated in FIGS. 1-7 and discussed previously. Step 820 may, for example, comprise spectrally shifting the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with a second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, step 820 may comprise implementing a frequency-hopping scheme with the first baseband signal. For example, in a scenario where there are one or more frequency bands (e.g., a second frequency space) associated with a second baseband signal, step 820 may comprise spectrally shifting the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. In another non-limiting exemplary scenario, spectrally shifting the first baseband signal may result in the production of a spectral image (e.g., frequency content mirrored about a mixing frequency

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	utilized to spectrally shift the first baseband signal). In such a scenario, step 820 may comprise accepting or rejecting the image. In a scenario where an image is rejected, step 820 may comprise rejecting the image in any of a variety of manners. For example and without limitation, step 820 may comprise performing image reject mixing to spectrally shift the first baseband signal. Such image reject mixing generally comprises spectrally shifting a signal and rejecting an image associated with the spectrally shifted signal. Also for example, step 820 may comprise filtering out an unwanted image. The scope of various aspects of the present invention should not be limited by the utilization of image rejection or by any particular manner of performing such image rejection. The exemplary method 800 may, at step 830, comprise generating and/or receiving a second baseband signal corresponding to a second communication protocol (e.g., different from the first communication protocol). Step 830 may, for example and without limitation, share any or all functional characteristics with the second input 102 of the exemplary system 100 illustrated in FIG. 1 and discussed previously. The second baseband signal may, for example, correspond to a second communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 830 comprises receiving the second baseband signal, step 830 may comprise receiving the second baseband signal in any manner generally associated with receiving a baseband signal. The second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 830 may, for example, comprise generating the second baseband signal independently (e.g., corresponding to a communication independent of a communication associated with the first baseband signal). Step 830 may alternatively, for example, comprise generating the second baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the second baseband signal and the first baseband signal for a single communication). *See, e.g.*, Rofougaran at 11:53-13:4.

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	Furthermore, this claim element is obvious in light of Rofougaran itself, when combined with any of the other references as charted for this claim element in Exs. A-1–A-31, First Supplemental Ex. A-Obviousness Chart, and/or when combined with the knowledge of one of ordinary skill in the art. Motivations to combine may come from the knowledge of the person of ordinary skill themselves, or from the known problems and predictable solutions as embodied in these references. Further motivations to combine references and additional details may be found in the Cover Pleading and First Supplemental Ex. A-Obviousness Chart.

Claim 10 of the ’802 Patent	Prior Art Reference – Rofougaran
[10.1] A method of transmitting information in a wireless communication channel comprising:	To the extent the preamble is limiting, Rofougaran discloses “A method of transmitting information in a wireless communication channel comprising.” See, e.g.: FIG. 1 is a diagram showing a portion of a first non-limiting exemplary communication system 100, in accordance with various aspects of the present invention. The communication system (or device) may comprise characteristics of any of a variety of communication systems/devices (e.g., multimode wireless communication devices). For example and without limitation, the communication system may comprise characteristics of any of a variety of mobile wireless communication devices (e.g., cellular phones, paging devices, portable email devices, etc.). Also for example, the communication system may comprise characteristics of fixed communication systems or devices (e.g., network access points, base stations, satellites, wireless routers, set top boxes, etc.). Further for example, the communication system may comprise characteristics of a variety of electronic devices with wireless communication capability (e.g., televisions, music players, cameras, remote controls, personal digital assistants, handheld computers, gaming devices, etc.). Accordingly, the scope of various aspects of the present invention should not be limited by characteristics of particular communication systems or devices. The following discussion will, at times, refer to various communication modes. A multimode communication device may, for example, be adapted to communicate in a plurality of such

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	communication modes. For the following discussion, a communication mode may generally be considered to coincide with communication utilizing a particular communication protocol or standard. A non-limiting list of exemplary communication protocols includes various cellular communication protocols (e.g., GSM, GPRS, EDGE, CDMA, WCDMA, TDMA, PDC, etc.), various wireless networking protocols or standards, including WLAN, WMAN, WPAN and WWAN (e.g., IEEE 802.11, Bluetooth, IEEE 802.15, UWB, IEEE 802.16, IEEE 802.20, Zigbee, any WiFi protocol, etc.), various television communication standards, etc. The scope of various aspects of the present invention should not be limited by characteristics of particular communication modes or protocols, whether standard or proprietary. *See, e.g.*, Rofougaran at 2:36-3:6. Furthermore, this claim element is obvious in light of Rofougaran itself, when combined with any of the other references as charted for this claim element in Exs. A-1–A-31, First Supplemental Ex. A-Obviousness Chart, and/or when combined with the knowledge of one of ordinary skill in the art. Motivations to combine may come from the knowledge of the person of ordinary skill themselves, or from the known problems and predictable solutions as embodied in these references. Further motivations to combine references and additional details may be found in the Cover Pleading and First Supplemental Ex. A-Obviousness Chart.
[10.2] receiving a first digital signal comprising first data to be transmitted;	Rofougaran discloses "receiving a first digital signal comprising first data to be transmitted." See, e.g.:

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	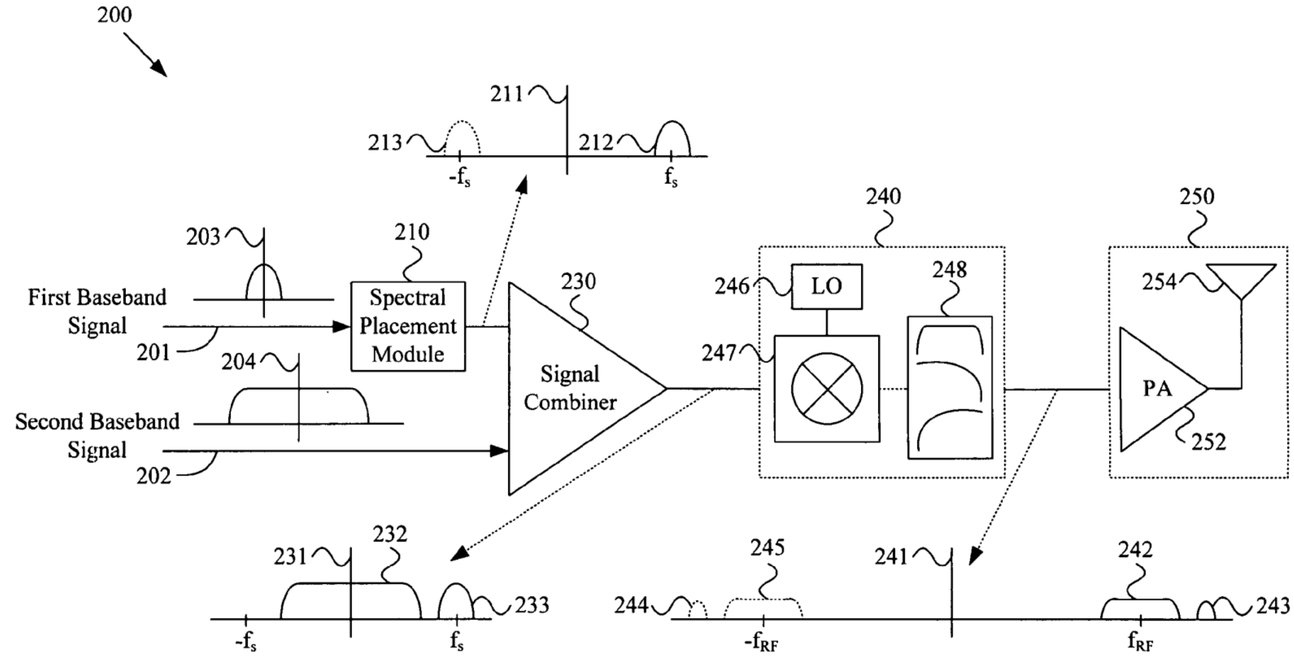 Figure 2 *See, e.g.*, Rofougaran at Figure 2.

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	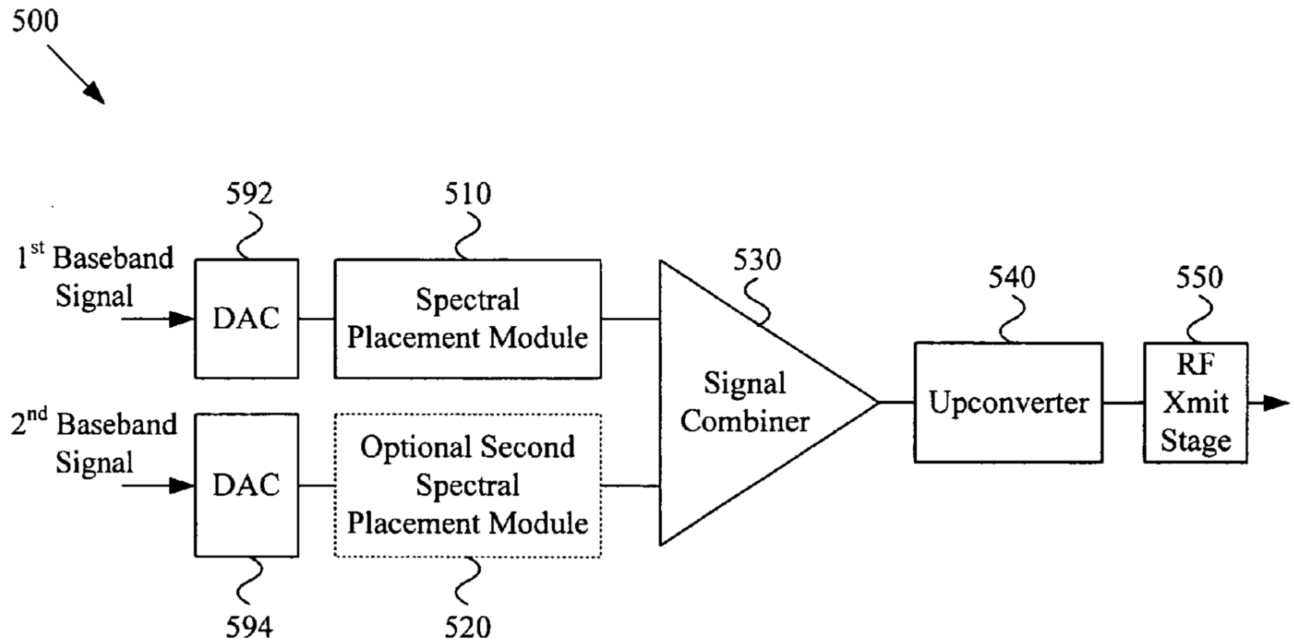 Figure 5 *See, e.g.*, Rofougaran at Figure 5.

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	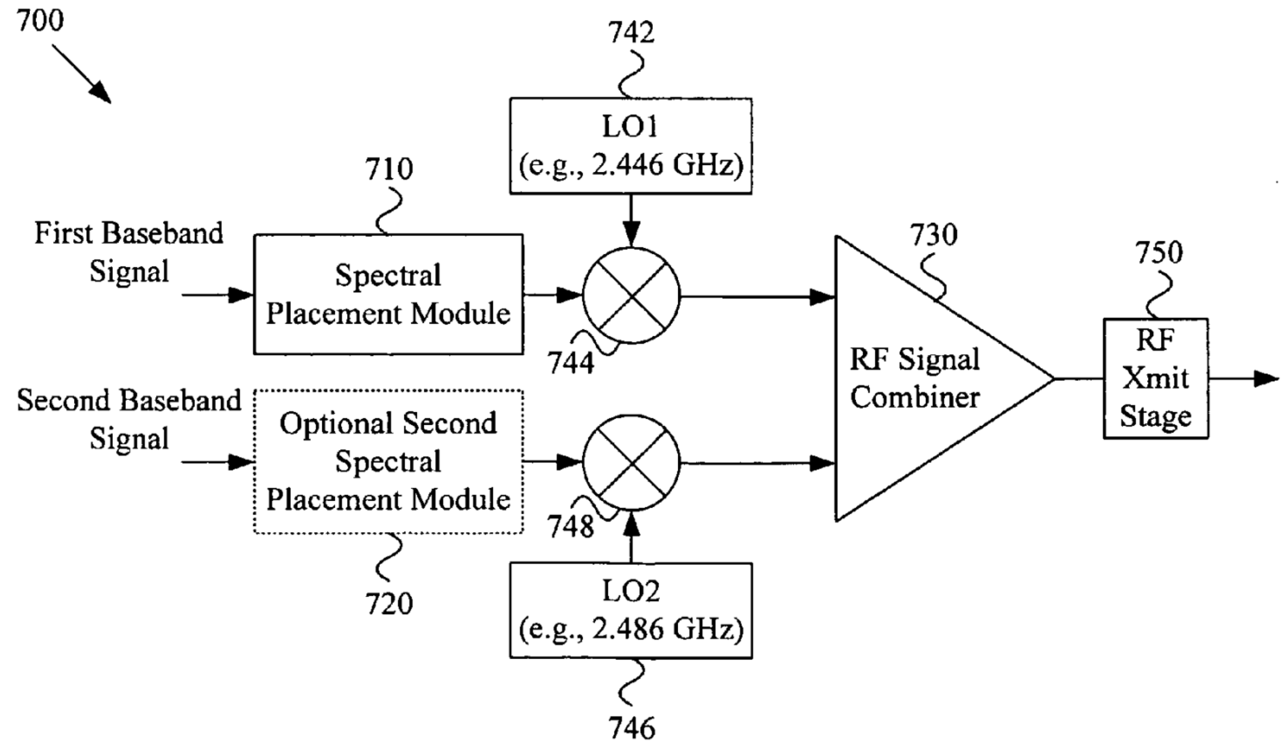 Figure 7 *See, e.g.*, Rofougaran at Figure 7. FIG. 1 is a diagram showing a portion of a first non-limiting exemplary communication system 100, in accordance with various aspects of the present invention. The communication system (or device) may comprise characteristics of any of a variety of communication systems/devices (e.g., multimode wireless communication devices). For example and without limitation, the communication system may comprise characteristics of any of a variety of mobile wireless communication devices (e.g.,

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	cellular phones, paging devices, portable email devices, etc.). Also for example, the communication system may comprise characteristics of fixed communication systems or devices (e.g., network access points, base stations, satellites, wireless routers, set top boxes, etc.). Further for example, the communication system may comprise characteristics of a variety of electronic devices with wireless communication capability (e.g., televisions, music players, cameras, remote controls, personal digital assistants, handheld computers, gaming devices, etc.). Accordingly, the scope of various aspects of the present invention should not be limited by characteristics of particular communication systems or devices. The following discussion will, at times, refer to various communication modes. A multimode communication device may, for example, be adapted to communicate in a plurality of such communication modes. For the following discussion, a communication mode may generally be considered to coincide with communication utilizing a particular communication protocol or standard. A non-limiting list of exemplary communication protocols includes various cellular communication protocols (e.g., GSM, GPRS, EDGE, CDMA, WCDMA, TDMA, PDC, etc.), various wireless networking protocols or standards, including WLAN, WMAN, WPAN and WWAN (e.g., IEEE 802.11, Bluetooth, IEEE 802.15, UWB, IEEE 802.16, IEEE 802.20, Zigbee, any WiFi protocol, etc.), various television communication standards, etc. The scope of various aspects of the present invention should not be limited by characteristics of particular communication modes or protocols, whether standard or proprietary. The exemplary communication system 100 may comprise at least a first input 101 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to any of the previously mentioned communication protocols. The exemplary communication system 100 may also comprise at least a second input 102 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first

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	communication protocol discussed above). For example and without limitation, the second baseband signal may correspond to any of the previously mentioned communication protocols. The first baseband signal and the second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of the communication system 100. For example, such modules may generate the first and second baseband signals independently (e.g., corresponding to independent respective communications). Alternatively, for example, such modules may generate the first and second baseband signals in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first and second baseband signals for a single communication). The exemplary communication system 100 may additionally comprise a spectral placement module 110 that is adapted to spectrally shift the first baseband signal (i.e., shift the frequency spectrum of the first baseband signal). In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to spectrally shift the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with the second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to implement a frequency-hopping scheme with the first baseband signal. For example, in a scenario, where there are one or more frequency bands (e.g., a second frequency space) associated with the second baseband signal, the spectral placement module 110 may be adapted to shift the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. *See, e.g.*, Rofougaran at 2:38-3:58. The exemplary communication system 100 may also comprise a second spectral placement module 120. Such a second spectral placement module 120 may, for example, share any or all characteristics

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	with the spectral placement module 110 discussed previously. The incorporation of such a second spectral placement module 120 may, for example, provide spectral shifting flexibility. For example, in such an exemplary configuration, either or both of the first and second baseband signals may be spectrally shifted to substantially distinct frequency spaces. Also for example, in such an exemplary configuration, either or both of the first and second baseband signals may be frequency hopped. Note that though the second spectral placement module 120 is illustrated separate from the first spectral placement module 110, the second spectral placement module 120 may share any or all hardware and/or software components with the spectral placement module 110. The exemplary communication system 100 may further comprise a signal combiner 130 that is adapted to generate a composite signal comprising various input signals to the signal combiner 130. For example, the composite signal may simultaneously (i.e., at an instant in time) comprise components associated with various input signals. Note that such simultaneity need not always be present. For example, at a first instant in time, the signal output from the signal combiner 130 might comprise a plurality of components associated with a plurality of respective input signals, at a second instant in time, the signal output from the signal combiner 130 might comprise a single component associated with a single respective input signal, and at a third instant in time, the signal output from the signal combiner 130 might comprise no components. In a first non-limiting exemplary scenario, the signal combiner 130 may receive a first signal that is based on the first baseband signal (e.g., associated with a first communication protocol). Also, the signal combiner 130 may receive a second signal that is based on the second baseband signal (e.g., associated with a second communication protocol). In such a scenario, the signal combiner 130 may combine the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the first baseband signal and a second signal component based on the second baseband signal. In such a scenario, for example where the frequency spectra of the first and second baseband signals do not overlap, the first and second baseband signals might not be spectrally shifted prior to combining by the signal combiner 130. In such a scenario, the spectral placement module 110 (and optionally, the second spectral placement module 120) may receive a control signal indicating whether or not to perform spectral shifting and/or to what degree spectral shifting should be implemented.

Claim 10 of the ’802 Patent	**Prior Art Reference – Rofougaran**
	See, e.g., Rofougaran at 4:16-67. Various components of the exemplary communication system 100 (and other communication systems illustrated and discussed herein) may be implemented in analog and/or digital circuitry. To illustrate this, the exemplary communication system 100 is not shown with analog-to-digital converters (ADCs) or digital-to-analog converters (DACs). FIGS. 4-6, to be discussed later, show various non-limiting exemplary configurations including such converters. FIG. 2 is a diagram showing a portion of a second non-limiting exemplary communication system 200, in accordance with various aspects of the present invention. The communication system 200 may, for example and without limitation, share any or all characteristics with the communication system 100 illustrated in FIG. 1 and discussed previously. The exemplary communication system 200 may comprise at least a first input 201 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to the Bluetooth communication protocol. FIG. 2 shows an exemplary frequency spectrum 203 associated with the first baseband signal. The exemplary communication system 200 may also comprise at least a second input 202 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first communication protocol discussed above). For example and without limitation, the first baseband signal may correspond to an IEEE 802.11 communication protocol (e.g., IEEE 802.11(b) or IEEE 802.11(g)). FIG. 2 shows an exemplary frequency spectrum 204 associated with the second baseband signal. *See, e.g.*, Rofougaran at 5:64-6:31.

Claim 10 of the ’802 Patent	Prior Art Reference – Rofougaran
	In a non-limiting exemplary configuration illustrated in FIG. 2, the signal combiner 230 receives a first signal from the spectral placement module 210 that is based on the spectrally shifted first baseband signal. Also, the signal combiner 230 receives a second signal that is based on the second baseband signal. In such a configuration, the signal combiner 230 combines the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the spectrally shifted first baseband signal and a second signal component based on the second baseband signal (e.g., not spectrally shifted). FIG. 2 shows an exemplary frequency spectrum 231 associated with the composite signal formed by the signal combiner 230. The spectrum 231 comprises a first portion 233 corresponding to the first signal component, and a second portion 232 corresponding to the second signal component. Note that the first portion 233 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 232. The exemplary communication system 200 may also comprise an upconverter 240 adapted to upconvert a signal (e.g., the composite signal from the signal combiner 230) for transmission. The upconverter 240 may, for example and without limitation, share any or all characteristics with the upconverter 140 discussed previously. The upconverter 240 may, for example, comprise a mixer 247, a local oscillator 246 and one or more filters 248. The mixer 247 may, for example, receive the composite signal from the signal combiner 230 and an RF mixing signal at frequency fRF from a local oscillator 246. The upconverter 240 may, for example, filter the upconverted signal from the mixer 247 with one or more filters 248. The output of the upconverter 240 may, for example, comprise a signal indicative of the composite signal spectrally shifted to an RF frequency. FIG. 2 shows an exemplary frequency spectrum 241 associated with the RF signal formed by the upconverter 240. The frequency spectrum 241 comprises a first portion 243 corresponding to the first signal component and a second portion 242 corresponding to the second signal component. Note that the first portion 243 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 242. Also note that the first portion 243 and

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	second portion 242 might be formed with a first mirror portion 244 and second mirror portion 245, respectively. Note that a mirror portion may either be removed or may be kept for later processing. The exemplary communication system 200 may further comprise a RF transmission stage 250 adapted to transmit an RF signal. The RF transmission stage 250 may, for example and without limitation, share any or all characteristics with the RF transmission stage 150 discussed previously. Such an RF signal may, for example, be associated with the composite signal output from the signal combiner 230 and upconverted by the upconverter 240. The RF transmission stage 250 may, for example and without limitation, comprise a power amplifier 252, antenna 254 and other components generally associated with RF signal transmission. *See, e.g.*, Rofougaran at 6:66-7:57. For example, the spectral placement module 510, optional second spectral placement module 520 and signal combiner 530 may operate in the analog domain. The first digital-to-analog converter 592 may convert the first baseband signal to the analog domain for processing by the spectral placement module 510. The second digital-to-analog converter 594 may convert the second baseband signal to the analog domain for processing by the second spectral placement module 520 or signal combiner 530. The signal combiner 530 then combines signals in the analog domain to generate an analog composite signal, which is then upconverted and transmitted by the upconverter 540 and RF transmission stage 550, respectively. *See, e.g.*, Rofougaran at 9:30-41. FIG. 7 is a diagram showing a portion of a seventh non-limiting exemplary communication system 700, in accordance with various aspects of the present invention. The exemplary communication system 700 may, for example and without limitation, share any or all characteristics with the exemplary systems 100-600 illustrated in FIGS. 1-6 and discussed previously. The exemplary communication system 700 may comprise a first mixer 744 that receives a spectrally shifted first baseband signal from the spectral placement module 710 and a first RF mixing signal (e.g., a 2.446 GHz signal generally associated with the Bluetooth communication protocol) from a

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	first local oscillator 742. The exemplary communication system 700 may also comprise a second mixer 748 that receives a second baseband signal (or a spectrally shifted second baseband signal) and a second RF mixing signal (e.g., a 2.486 GHz signal generally associated with the IEEE 802.11(g) communication protocol) from a second local oscillator 746. The exemplary communication system 700 may comprise an RF signal combiner 730 that is adapted to combine input RF signals. The RF signal combiner 730 may, for example, receive and combine the output signals from the first mixer 744 and second mixer 748 to generate an RF composite signal. The exemplary communication system 700 may also comprise a RF transmission stage 750 that receives the RF composite signal from the RF signal combiner 730 and transmit the signal. *See*, *e.g.*, Rofougaran at 10:18-43. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 810 comprises receiving the first baseband signal, step 810 may comprise receiving the first baseband signal in any manner generally associated with receiving a baseband signal. The first baseband signal may, for example, be generated by one or more modules (i.e., hard ware and/or software modules) of a communication system implementing the exemplary method 800. Step 810 may, for example, comprise generating the first baseband signal independently (e.g., corresponding to an independent communication). Step 810 may alternatively, for example, comprise generating the first baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first baseband signal and other baseband signals for a single communication). The exemplary method 800 may, at step 820, comprise spectrally placing (or shifting) the first baseband signal (e.g., received at step 810). Step 820 may, for example and without limitation, share any or all functional characteristics with the spectral placement modules 110-710 of the exemplary systems 100-700 illustrated in FIGS. 1-7 and discussed previously.

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	Step 820 may, for example, comprise spectrally shifting the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with a second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, step 820 may comprise implementing a frequency-hopping scheme with the first baseband signal. For example, in a scenario where there are one or more frequency bands (e.g., a second frequency space) associated with a second baseband signal, step 820 may comprise spectrally shifting the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. In another non-limiting exemplary scenario, spectrally shifting the first baseband signal may result in the production of a spectral image (e.g., frequency content mirrored about a mixing frequency utilized to spectrally shift the first baseband signal). In such a scenario, step 820 may comprise accepting or rejecting the image. In a scenario where an image is rejected, step 820 may comprise rejecting the image in any of a variety of manners. For example and without limitation, step 820 may comprise performing image reject mixing to spectrally shift the first baseband signal. Such image reject mixing generally comprises spectrally shifting a signal and rejecting an image associated with the spectrally shifted signal. Also for example, step 820 may comprise filtering out an unwanted image. The scope of various aspects of the present invention should not be limited by the utilization of image rejection or by any particular manner of performing such image rejection. The exemplary method 800 may, at step 830, comprise generating and/or receiving a second baseband signal corresponding to a second communication protocol (e.g., different from the first communication protocol). Step 830 may, for example and without limitation, share any or all functional characteristics with the second input 102 of the exemplary system 100 illustrated in FIG. 1 and discussed previously.

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	The second baseband signal may, for example, correspond to a second communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 830 comprises receiving the second baseband signal, step 830 may comprise receiving the second baseband signal in any manner generally associated with receiving a baseband signal. The second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 830 may, for example, comprise generating the second baseband signal independently (e.g., corresponding to a communication independent of a communication associated with the first baseband signal). Step 830 may alternatively, for example, comprise generating the second baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the second baseband signal and the first baseband signal for a single communication). *See, e.g.*, Rofougaran at 11:53-13:4. Furthermore, this claim element is obvious in light of Rofougaran itself, when combined with any of the other references as charted for this claim element in Exs. A-1–A-31, First Supplemental Ex. A-Obviousness Chart, and/or when combined with the knowledge of one of ordinary skill in the art. Motivations to combine may come from the knowledge of the person of ordinary skill themselves, or from the known problems and predictable solutions as embodied in these references. Further motivations to combine references and additional details may be found in the Cover Pleading and First Supplemental Ex. A-Obviousness Chart.
[10.3] receiving a second digital signal comprising second data to be transmitted;	Rofougaran discloses “receiving a second digital signal comprising second data to be transmitted.” See, e.g.:

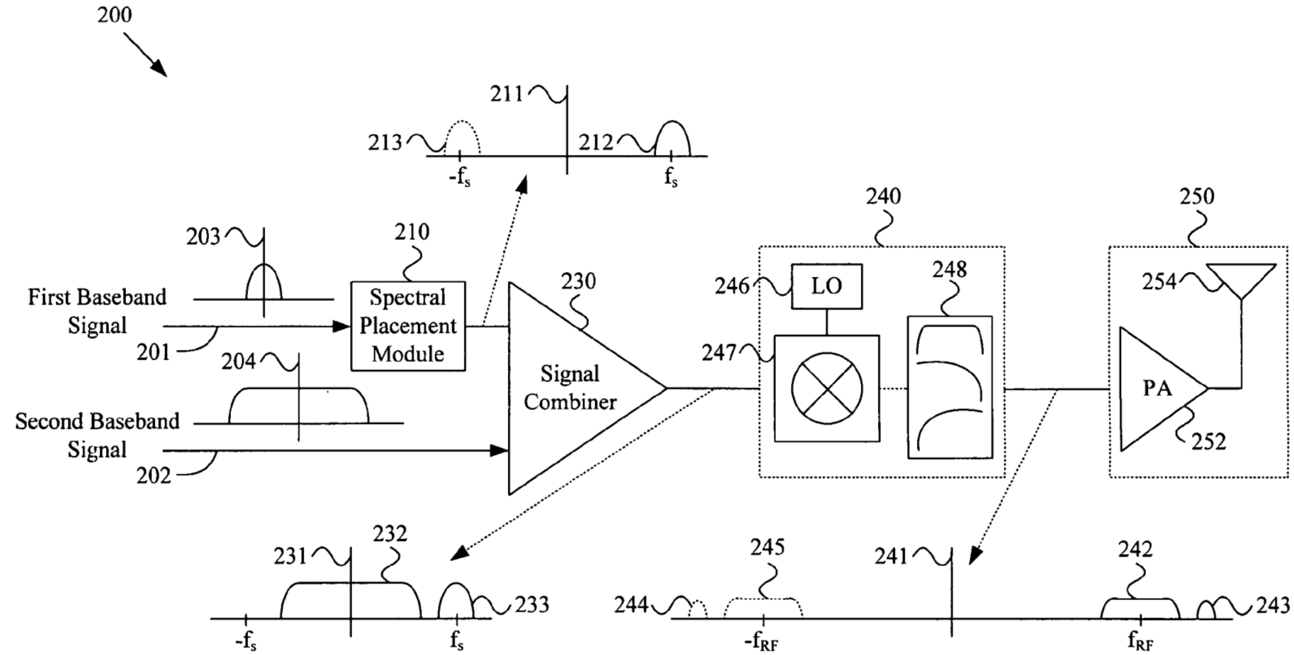
<table>
<tr><th>Claim 10 of the ’802 Patent</th><th>Prior Art Reference – Rofougaran</th></tr>
<tr><td></td><td>

Figure 2

See, e.g., Rofougaran at Figure 2.</td></tr>
</table>

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	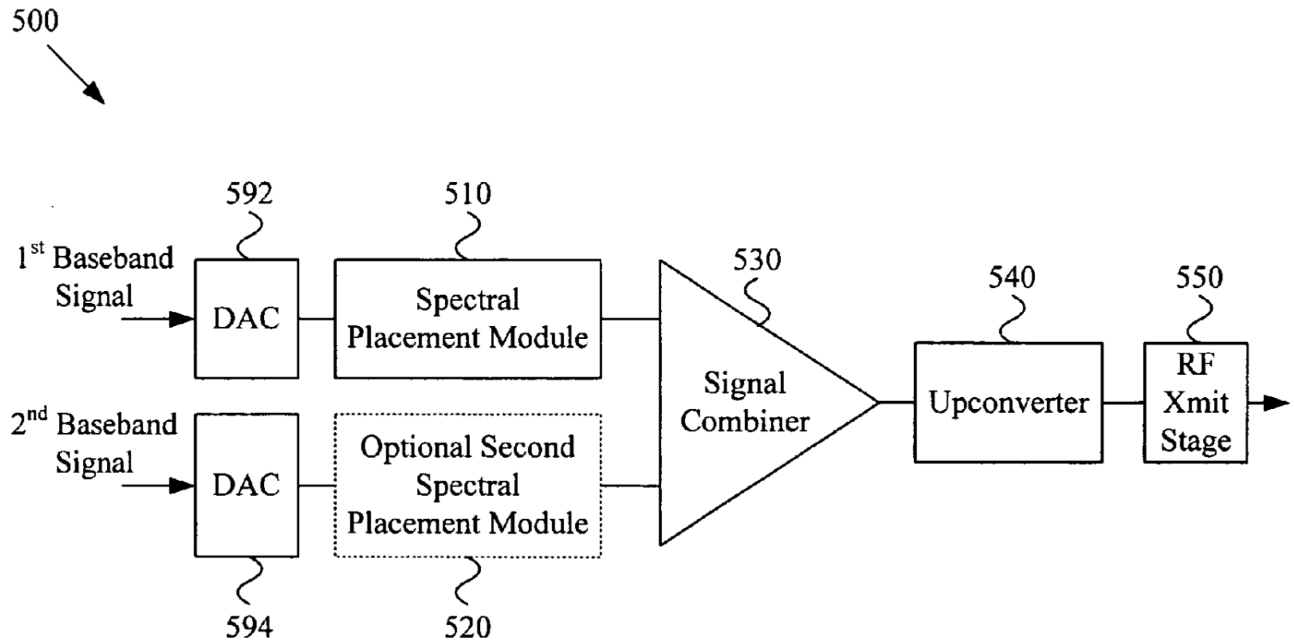 Figure 5 *See, e.g.*, Rofougaran at Figure 5.

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	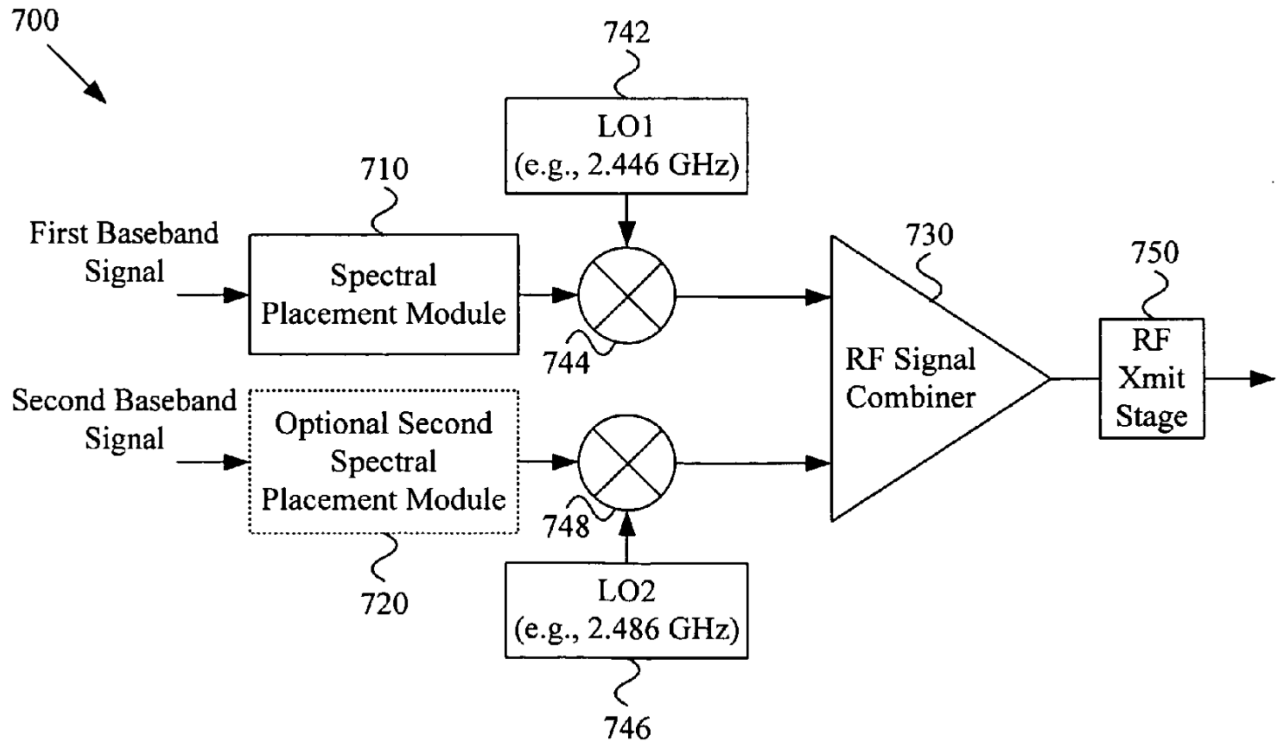 Figure 7 *See, e.g.*, Rofougaran at Figure 7. FIG. 1 is a diagram showing a portion of a first non-limiting exemplary communication system 100, in accordance with various aspects of the present invention. The communication system (or device) may comprise characteristics of any of a variety of communication systems/devices (e.g., multimode wireless communication devices). For example and without limitation, the communication system may comprise characteristics of any of a variety of mobile wireless communication devices (e.g.,

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	cellular phones, paging devices, portable email devices, etc.). Also for example, the communication system may comprise characteristics of fixed communication systems or devices (e.g., network access points, base stations, satellites, wireless routers, set top boxes, etc.). Further for example, the communication system may comprise characteristics of a variety of electronic devices with wireless communication capability (e.g., televisions, music players, cameras, remote controls, personal digital assistants, handheld computers, gaming devices, etc.). Accordingly, the scope of various aspects of the present invention should not be limited by characteristics of particular communication systems or devices. The following discussion will, at times, refer to various communication modes. A multimode communication device may, for example, be adapted to communicate in a plurality of such communication modes. For the following discussion, a communication mode may generally be considered to coincide with communication utilizing a particular communication protocol or standard. A non-limiting list of exemplary communication protocols includes various cellular communication protocols (e.g., GSM, GPRS, EDGE, CDMA, WCDMA, TDMA, PDC, etc.), various wireless networking protocols or standards, including WLAN, WMAN, WPAN and WWAN (e.g., IEEE 802.11, Bluetooth, IEEE 802.15, UWB, IEEE 802.16, IEEE 802.20, Zigbee, any WiFi protocol, etc.), various television communication standards, etc. The scope of various aspects of the present invention should not be limited by characteristics of particular communication modes or protocols, whether standard or proprietary. The exemplary communication system 100 may comprise at least a first input 101 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to any of the previously mentioned communication protocols. The exemplary communication system 100 may also comprise at least a second input 102 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first

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	communication protocol discussed above). For example and without limitation, the second baseband signal may correspond to any of the previously mentioned communication protocols. The first baseband signal and the second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of the communication system 100. For example, such modules may generate the first and second baseband signals independently (e.g., corresponding to independent respective communications). Alternatively, for example, such modules may generate the first and second baseband signals in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first and second baseband signals for a single communication). The exemplary communication system 100 may additionally comprise a spectral placement module 110 that is adapted to spectrally shift the first baseband signal (i.e., shift the frequency spectrum of the first baseband signal). In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to spectrally shift the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with the second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to implement a frequency-hopping scheme with the first baseband signal. For example, in a scenario, where there are one or more frequency bands (e.g., a second frequency space) associated with the second baseband signal, the spectral placement module 110 may be adapted to shift the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. *See, e.g.*, Rofougaran at 2:38-3:58. The exemplary communication system 100 may also comprise a second spectral placement module 120. Such a second spectral placement module 120 may, for example, share any or all characteristics

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	with the spectral placement module 110 discussed previously. The incorporation of such a second spectral placement module 120 may, for example, provide spectral shifting flexibility. For example, in such an exemplary configuration, either or both of the first and second baseband signals may be spectrally shifted to substantially distinct frequency spaces. Also for example, in such an exemplary configuration, either or both of the first and second baseband signals may be frequency hopped. Note that though the second spectral placement module 120 is illustrated separate from the first spectral placement module 110, the second spectral placement module 120 may share any or all hardware and/or software components with the spectral placement module 110. The exemplary communication system 100 may further comprise a signal combiner 130 that is adapted to generate a composite signal comprising various input signals to the signal combiner 130. For example, the composite signal may simultaneously (i.e., at an instant in time) comprise components associated with various input signals. Note that such simultaneity need not always be present. For example, at a first instant in time, the signal output from the signal combiner 130 might comprise a plurality of components associated with a plurality of respective input signals, at a second instant in time, the signal output from the signal combiner 130 might comprise a single component associated with a single respective input signal, and at a third instant in time, the signal output from the signal combiner 130 might comprise no components. In a first non-limiting exemplary scenario, the signal combiner 130 may receive a first signal that is based on the first baseband signal (e.g., associated with a first communication protocol). Also, the signal combiner 130 may receive a second signal that is based on the second baseband signal (e.g., associated with a second communication protocol). In such a scenario, the signal combiner 130 may combine the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the first baseband signal and a second signal component based on the second baseband signal. In such a scenario, for example where the frequency spectra of the first and second baseband signals do not overlap, the first and second baseband signals might not be spectrally shifted prior to combining by the signal combiner 130. In such a scenario, the spectral placement module 110 (and optionally, the second spectral placement module 120) may receive a control signal indicating whether or not to perform spectral shifting and/or to what degree spectral shifting should be implemented.

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	See, e.g., Rofougaran at 4:16-67. Various components of the exemplary communication system 100 (and other communication systems illustrated and discussed herein) may be implemented in analog and/or digital circuitry. To illustrate this, the exemplary communication system 100 is not shown with analog-to-digital converters (ADCs) or digital-to-analog converters (DACs). FIGS. 4-6, to be discussed later, show various non-limiting exemplary configurations including such converters. FIG. 2 is a diagram showing a portion of a second non-limiting exemplary communication system 200, in accordance with various aspects of the present invention. The communication system 200 may, for example and without limitation, share any or all characteristics with the communication system 100 illustrated in FIG. 1 and discussed previously. The exemplary communication system 200 may comprise at least a first input 201 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to the Bluetooth communication protocol. FIG. 2 shows an exemplary frequency spectrum 203 associated with the first baseband signal. The exemplary communication system 200 may also comprise at least a second input 202 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first communication protocol discussed above). For example and without limitation, the first baseband signal may correspond to an IEEE 802.11 communication protocol (e.g., IEEE 802.11(b) or IEEE 802.11(g)). FIG. 2 shows an exemplary frequency spectrum 204 associated with the second baseband signal. *See, e.g.*, Rofougaran at 5:64-6:31.

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	In a non-limiting exemplary configuration illustrated in FIG. 2, the signal combiner 230 receives a first signal from the spectral placement module 210 that is based on the spectrally shifted first baseband signal. Also, the signal combiner 230 receives a second signal that is based on the second baseband signal. In such a configuration, the signal combiner 230 combines the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the spectrally shifted first baseband signal and a second signal component based on the second baseband signal (e.g., not spectrally shifted). FIG. 2 shows an exemplary frequency spectrum 231 associated with the composite signal formed by the signal combiner 230. The spectrum 231 comprises a first portion 233 corresponding to the first signal component, and a second portion 232 corresponding to the second signal component. Note that the first portion 233 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 232. The exemplary communication system 200 may also comprise an upconverter 240 adapted to upconvert a signal (e.g., the composite signal from the signal combiner 230) for transmission. The upconverter 240 may, for example and without limitation, share any or all characteristics with the upconverter 140 discussed previously. The upconverter 240 may, for example, comprise a mixer 247, a local oscillator 246 and one or more filters 248. The mixer 247 may, for example, receive the composite signal from the signal combiner 230 and an RF mixing signal at frequency fRF from a local oscillator 246. The upconverter 240 may, for example, filter the upconverted signal from the mixer 247 with one or more filters 248. The output of the upconverter 240 may, for example, comprise a signal indicative of the composite signal spectrally shifted to an RF frequency. FIG. 2 shows an exemplary frequency spectrum 241 associated with the RF signal formed by the upconverter 240. The frequency spectrum 241 comprises a first portion 243 corresponding to the first signal component and a second portion 242 corresponding to the second signal component. Note that the first portion 243 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 242. Also note that the first portion 243 and

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	second portion 242 might be formed with a first mirror portion 244 and second mirror portion 245, respectively. Note that a mirror portion may either be removed or may be kept for later processing. The exemplary communication system 200 may further comprise a RF transmission stage 250 adapted to transmit an RF signal. The RF transmission stage 250 may, for example and without limitation, share any or all characteristics with the RF transmission stage 150 discussed previously. Such an RF signal may, for example, be associated with the composite signal output from the signal combiner 230 and upconverted by the upconverter 240. The RF transmission stage 250 may, for example and without limitation, comprise a power amplifier 252, antenna 254 and other components generally associated with RF signal transmission. *See, e.g.*, Rofougaran at 6:66-7:57. For example, the spectral placement module 510, optional second spectral placement module 520 and signal combiner 530 may operate in the analog domain. The first digital-to-analog converter 592 may convert the first baseband signal to the analog domain for processing by the spectral placement module 510. The second digital-to-analog converter 594 may convert the second baseband signal to the analog domain for processing by the second spectral placement module 520 or signal combiner 530. The signal combiner 530 then combines signals in the analog domain to generate an analog composite signal, which is then upconverted and transmitted by the upconverter 540 and RF transmission stage 550, respectively. *See, e.g.*, Rofougaran at 9:30-41. FIG. 7 is a diagram showing a portion of a seventh non-limiting exemplary communication system 700, in accordance with various aspects of the present invention. The exemplary communication system 700 may, for example and without limitation, share any or all characteristics with the exemplary systems 100-600 illustrated in FIGS. 1-6 and discussed previously. The exemplary communication system 700 may comprise a first mixer 744 that receives a spectrally shifted first baseband signal from the spectral placement module 710 and a first RF mixing signal (e.g., a 2.446 GHz signal generally associated with the Bluetooth communication protocol) from a

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	first local oscillator 742. The exemplary communication system 700 may also comprise a second mixer 748 that receives a second baseband signal (or a spectrally shifted second baseband signal) and a second RF mixing signal (e.g., a 2.486 GHz signal generally associated with the IEEE 802.11(g) communication protocol) from a second local oscillator 746. The exemplary communication system 700 may comprise an RF signal combiner 730 that is adapted to combine input RF signals. The RF signal combiner 730 may, for example, receive and combine the output signals from the first mixer 744 and second mixer 748 to generate an RF composite signal. The exemplary communication system 700 may also comprise a RF transmission stage 750 that receives the RF composite signal from the RF signal combiner 730 and transmit the signal. *See*, *e.g.*, Rofougaran at 10:18-43. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 810 comprises receiving the first baseband signal, step 810 may comprise receiving the first baseband signal in any manner generally associated with receiving a baseband signal. The first baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 810 may, for example, comprise generating the first baseband signal independently (e.g., corresponding to an independent communication). Step 810 may alternatively, for example, comprise generating the first baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first baseband signal and other baseband signals for a single communication). The exemplary method 800 may, at step 820, comprise spectrally placing (or shifting) the first baseband signal (e.g., received at step 810). Step 820 may, for example and without limitation, share any or all functional characteristics with the spectral placement modules 110-710 of the exemplary systems 100-700 illustrated in FIGS. 1-7 and discussed previously.

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	Step 820 may, for example, comprise spectrally shifting the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with a second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, step 820 may comprise implementing a frequency-hopping scheme with the first baseband signal. For example, in a scenario where there are one or more frequency bands (e.g., a second frequency space) associated with a second baseband signal, step 820 may comprise spectrally shifting the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. In another non-limiting exemplary scenario, spectrally shifting the first baseband signal may result in the production of a spectral image (e.g., frequency content mirrored about a mixing frequency utilized to spectrally shift the first baseband signal). In such a scenario, step 820 may comprise accepting or rejecting the image. In a scenario where an image is rejected, step 820 may comprise rejecting the image in any of a variety of manners. For example and without limitation, step 820 may comprise performing image reject mixing to spectrally shift the first baseband signal. Such image reject mixing generally comprises spectrally shifting a signal and rejecting an image associated with the spectrally shifted signal. Also for example, step 820 may comprise filtering out an unwanted image. The scope of various aspects of the present invention should not be limited by the utilization of image rejection or by any particular manner of performing such image rejection. The exemplary method 800 may, at step 830, comprise generating and/or receiving a second baseband signal corresponding to a second communication protocol (e.g., different from the first communication protocol). Step 830 may, for example and without limitation, share any or all functional characteristics with the second input 102 of the exemplary system 100 illustrated in FIG. 1 and discussed previously.

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	The second baseband signal may, for example, correspond to a second communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 830 comprises receiving the second baseband signal, step 830 may comprise receiving the second baseband signal in any manner generally associated with receiving a baseband signal. The second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 830 may, for example, comprise generating the second baseband signal independently (e.g., corresponding to a communication independent of a communication associated with the first baseband signal). Step 830 may alternatively, for example, comprise generating the second baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the second baseband signal and the first baseband signal for a single communication). *See, e.g.*, Rofougaran at 11:53-13:4. Furthermore, this claim element is obvious in light of Rofougaran itself, when combined with any of the other references as charted for this claim element in Exs. A-1–A-31, First Supplemental Ex. A-Obviousness Chart, and/or when combined with the knowledge of one of ordinary skill in the art. Motivations to combine may come from the knowledge of the person of ordinary skill themselves, or from the known problems and predictable solutions as embodied in these references. Further motivations to combine references and additional details may be found in the Cover Pleading and First Supplemental Ex. A-Obviousness Chart.
[10.4] converting the first digital signal into a first analog signal using a first digital-to-analog converter, the first analog signal carrying the first data across a first frequency range;.	Rofougaran discloses "converting the first digital signal into a first analog signal using a first digital-to-analog converter, the first analog signal carrying the first data across a first frequency range." See, e.g.:

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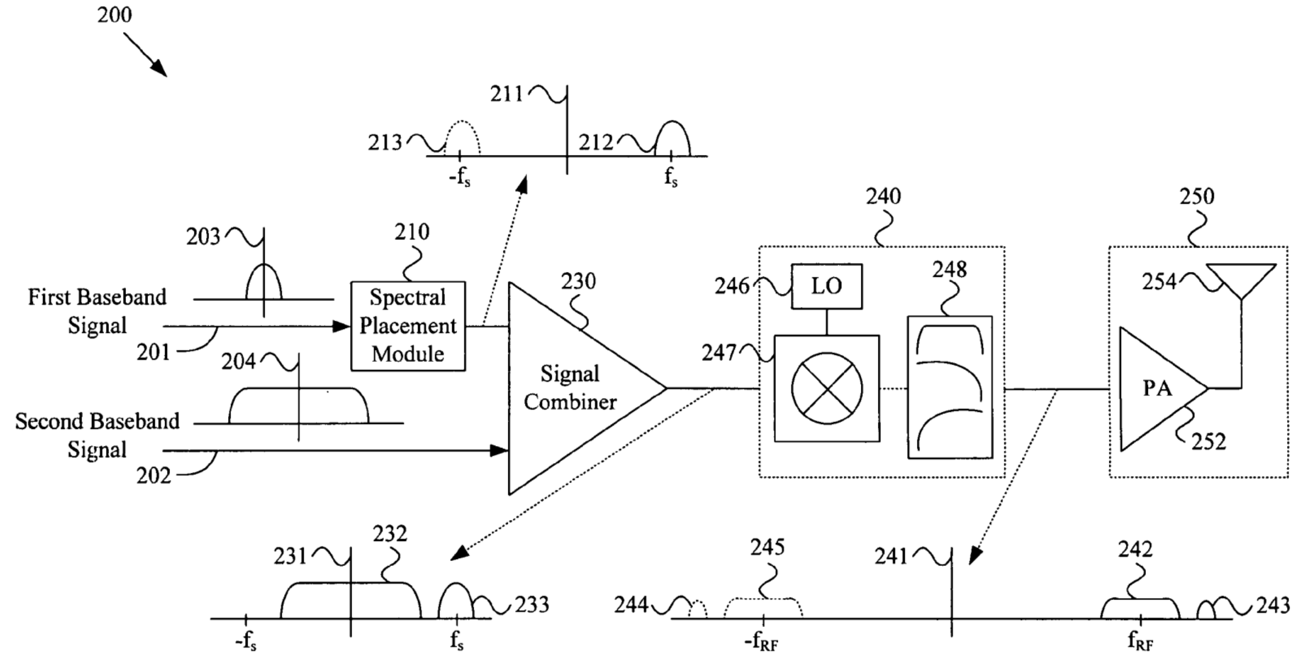
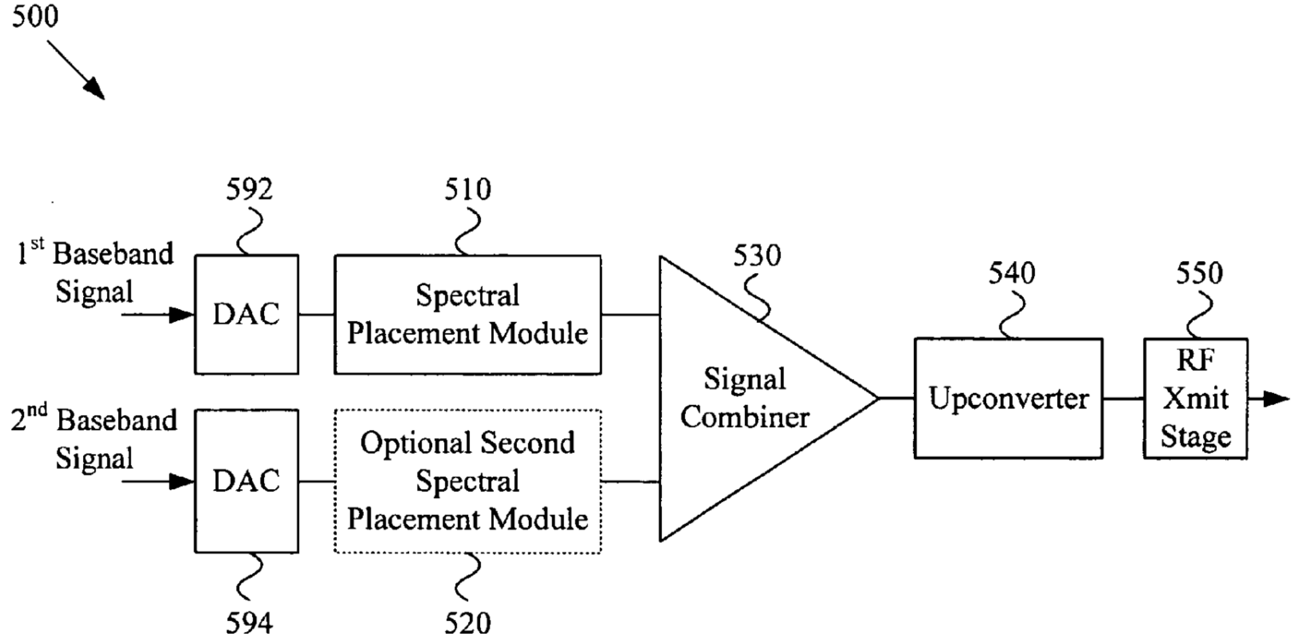
	 Figure 2 *See, e.g.*, Rofougaran at Figure 2.

Claim 10 of the '802 Patent	Prior Art Reference – Rofougaran
	 Figure 5 *See, e.g.*, Rofougaran at Figure 5.

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	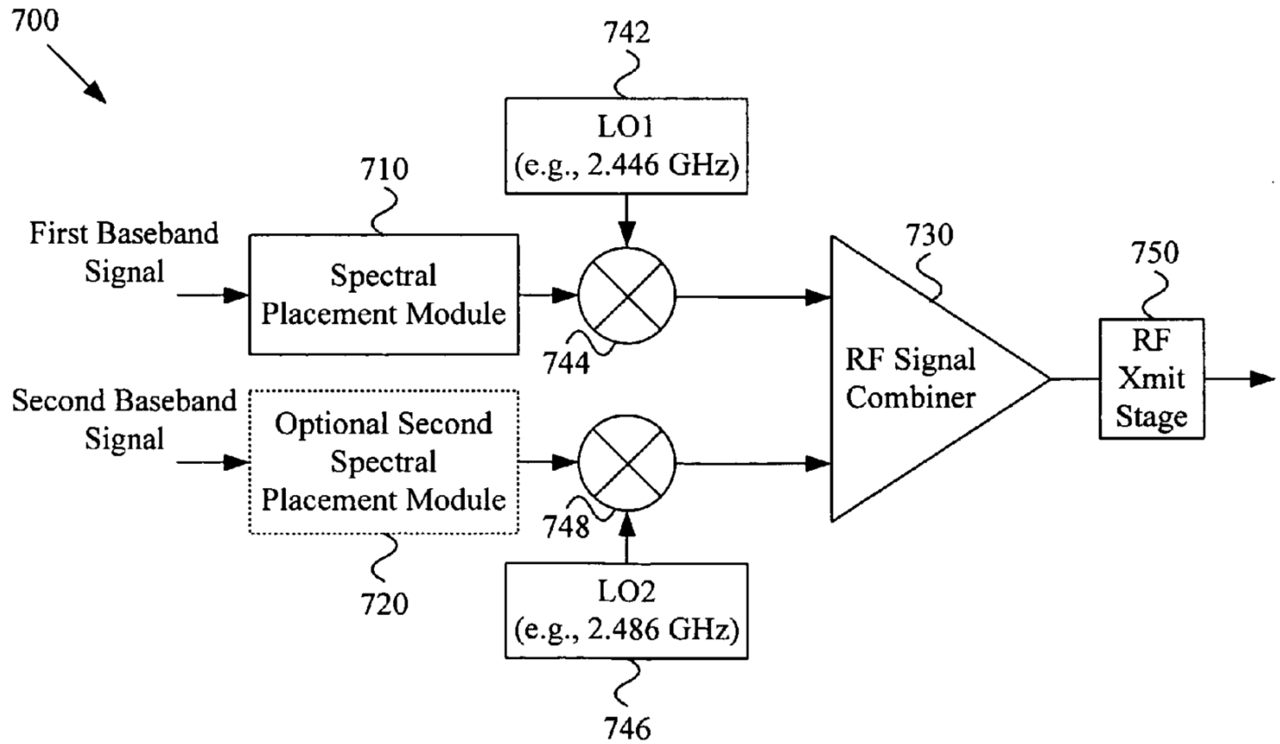 Figure 7 *See, e.g.*, Rofougaran at Figure 7. FIG. 1 is a diagram showing a portion of a first non-limiting exemplary communication system 100, in accordance with various aspects of the present invention. The communication system (or device) may comprise characteristics of any of a variety of communication systems/devices (e.g., multimode wireless communication devices). For example and without limitation, the communication system may comprise characteristics of any of a variety of mobile wireless communication devices (e.g.,

Claim 10 of the ’802 Patent	Prior Art Reference – Rofougaran
	cellular phones, paging devices, portable email devices, etc.). Also for example, the communication system may comprise characteristics of fixed communication systems or devices (e.g., network access points, base stations, satellites, wireless routers, set top boxes, etc.). Further for example, the communication system may comprise characteristics of a variety of electronic devices with wireless communication capability (e.g., televisions, music players, cameras, remote controls, personal digital assistants, handheld computers, gaming devices, etc.). Accordingly, the scope of various aspects of the present invention should not be limited by characteristics of particular communication systems or devices. The following discussion will, at times, refer to various communication modes. A multimode communication device may, for example, be adapted to communicate in a plurality of such communication modes. For the following discussion, a communication mode may generally be considered to coincide with communication utilizing a particular communication protocol or standard. A non-limiting list of exemplary communication protocols includes various cellular communication protocols (e.g., GSM, GPRS, EDGE, CDMA, WCDMA, TDMA, PDC, etc.), various wireless networking protocols or standards, including WLAN, WMAN, WPAN and WWAN (e.g., IEEE 802.11, Bluetooth, IEEE 802.15, UWB, IEEE 802.16, IEEE 802.20, Zigbee, any WiFi protocol, etc.), various television communication standards, etc. The scope of various aspects of the present invention should not be limited by characteristics of particular communication modes or protocols, whether standard or proprietary. The exemplary communication system 100 may comprise at least a first input 101 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to any of the previously mentioned communication protocols. The exemplary communication system 100 may also comprise at least a second input 102 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first

Claim 10 of the ’802 Patent	Prior Art Reference – Rofougaran
	communication protocol discussed above). For example and without limitation, the second baseband signal may correspond to any of the previously mentioned communication protocols. The first baseband signal and the second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of the communication system 100. For example, such modules may generate the first and second baseband signals independently (e.g., corresponding to independent respective communications). Alternatively, for example, such modules may generate the first and second baseband signals in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first and second baseband signals for a single communication). The exemplary communication system 100 may additionally comprise a spectral placement module 110 that is adapted to spectrally shift the first baseband signal (i.e., shift the frequency spectrum of the first baseband signal). In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to spectrally shift the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with the second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to implement a frequency-hopping scheme with the first baseband signal. For example, in a scenario, where there are one or more frequency bands (e.g., a second frequency space) associated with the second baseband signal, the spectral placement module 110 may be adapted to shift the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. *See, e.g.*, Rofougaran at 2:38-3:58. The exemplary communication system 100 may also comprise a second spectral placement module 120. Such a second spectral placement module 120 may, for example, share any or all characteristics

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	with the spectral placement module 110 discussed previously. The incorporation of such a second spectral placement module 120 may, for example, provide spectral shifting flexibility. For example, in such an exemplary configuration, either or both of the first and second baseband signals may be spectrally shifted to substantially distinct frequency spaces. Also for example, in such an exemplary configuration, either or both of the first and second baseband signals may be frequency hopped. Note that though the second spectral placement module 120 is illustrated separate from the first spectral placement module 110, the second spectral placement module 120 may share any or all hardware and/or software components with the spectral placement module 110. The exemplary communication system 100 may further comprise a signal combiner 130 that is adapted to generate a composite signal comprising various input signals to the signal combiner 130. For example, the composite signal may simultaneously (i.e., at an instant in time) comprise components associated with various input signals. Note that such simultaneity need not always be present. For example, at a first instant in time, the signal output from the signal combiner 130 might comprise a plurality of components associated with a plurality of respective input signals, at a second instant in time, the signal output from the signal combiner 130 might comprise a single component associated with a single respective input signal, and at a third instant in time, the signal output from the signal combiner 130 might comprise no components. In a first non-limiting exemplary scenario, the signal combiner 130 may receive a first signal that is based on the first baseband signal (e.g., associated with a first communication protocol). Also, the signal combiner 130 may receive a second signal that is based on the second baseband signal (e.g., associated with a second communication protocol). In such a scenario, the signal combiner 130 may combine the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the first baseband signal and a second signal component based on the second baseband signal. In such a scenario, for example where the frequency spectra of the first and second baseband signals do not overlap, the first and second baseband signals might not be spectrally shifted prior to combining by the signal combiner 130. In such a scenario, the spectral placement module 110 (and optionally, the second spectral placement module 120) may receive a control signal indicating whether or not to perform spectral shifting and/or to what degree spectral shifting should be implemented.

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	See, e.g., Rofougaran at 4:16-67. Various components of the exemplary communication system 100 (and other communication systems illustrated and discussed herein) may be implemented in analog and/or digital circuitry. To illustrate this, the exemplary communication system 100 is not shown with analog-to-digital converters (ADCs) or digital-to-analog converters (DACs). FIGS. 4-6, to be discussed later, show various non-limiting exemplary configurations including such converters. FIG. 2 is a diagram showing a portion of a second non-limiting exemplary communication system 200, in accordance with various aspects of the present invention. The communication system 200 may, for example and without limitation, share any or all characteristics with the communication system 100 illustrated in FIG. 1 and discussed previously. The exemplary communication system 200 may comprise at least a first input 201 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to the Bluetooth communication protocol. FIG. 2 shows an exemplary frequency spectrum 203 associated with the first baseband signal. The exemplary communication system 200 may also comprise at least a second input 202 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first communication protocol discussed above). For example and without limitation, the first baseband signal may correspond to an IEEE 802.11 communication protocol (e.g., IEEE 802.11(b) or IEEE 802.11(g)). FIG. 2 shows an exemplary frequency spectrum 204 associated with the second baseband signal. *See, e.g.*, Rofougaran at 5:64-6:31.

Claim 10 of the '802 Patent	Prior Art Reference – Rofougaran
	In a non-limiting exemplary configuration illustrated in FIG. 2, the signal combiner 230 receives a first signal from the spectral placement module 210 that is based on the spectrally shifted first baseband signal. Also, the signal combiner 230 receives a second signal that is based on the second baseband signal. In such a configuration, the signal combiner 230 combines the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the spectrally shifted first baseband signal and a second signal component based on the second baseband signal (e.g., not spectrally shifted). FIG. 2 shows an exemplary frequency spectrum 231 associated with the composite signal formed by the signal combiner 230. The spectrum 231 comprises a first portion 233 corresponding to the first signal component, and a second portion 232 corresponding to the second signal component. Note that the first portion 233 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 232. The exemplary communication system 200 may also comprise an upconverter 240 adapted to upconvert a signal (e.g., the composite signal from the signal combiner 230) for transmission. The upconverter 240 may, for example and without limitation, share any or all characteristics with the upconverter 140 discussed previously. The upconverter 240 may, for example, comprise a mixer 247, a local oscillator 246 and one or more filters 248. The mixer 247 may, for example, receive the composite signal from the signal combiner 230 and an RF mixing signal at frequency fRF from a local oscillator 246. The upconverter 240 may, for example, filter the upconverted signal from the mixer 247 with one or more filters 248. The output of the upconverter 240 may, for example, comprise a signal indicative of the composite signal spectrally shifted to an RF frequency. FIG. 2 shows an exemplary frequency spectrum 241 associated with the RF signal formed by the upconverter 240. The frequency spectrum 241 comprises a first portion 243 corresponding to the first signal component and a second portion 242 corresponding to the second signal component. Note that the first portion 243 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 242. Also note that the first portion 243 and

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	second portion 242 might be formed with a first mirror portion 244 and second mirror portion 245, respectively. Note that a mirror portion may either be removed or may be kept for later processing. The exemplary communication system 200 may further comprise a RF transmission stage 250 adapted to transmit an RF signal. The RF transmission stage 250 may, for example and without limitation, share any or all characteristics with the RF transmission stage 150 discussed previously. Such an RF signal may, for example, be associated with the composite signal output from the signal combiner 230 and upconverted by the upconverter 240. The RF transmission stage 250 may, for example and without limitation, comprise a power amplifier 252, antenna 254 and other components generally associated with RF signal transmission. *See, e.g.*, Rofougaran at 6:66-7:57. For example, the spectral placement module 510, optional second spectral placement module 520 and signal combiner 530 may operate in the analog domain. The first digital-to-analog converter 592 may convert the first baseband signal to the analog domain for processing by the spectral placement module 510. The second digital-to-analog converter 594 may convert the second baseband signal to the analog domain for processing by the second spectral placement module 520 or signal combiner 530. The signal combiner 530 then combines signals in the analog domain to generate an analog composite signal, which is then upconverted and transmitted by the upconverter 540 and RF transmission stage 550, respectively. *See, e.g.*, Rofougaran at 9:30-41. FIG. 7 is a diagram showing a portion of a seventh non-limiting exemplary communication system 700, in accordance with various aspects of the present invention. The exemplary communication system 700 may, for example and without limitation, share any or all characteristics with the exemplary systems 100-600 illustrated in FIGS. 1-6 and discussed previously. The exemplary communication system 700 may comprise a first mixer 744 that receives a spectrally shifted first baseband signal from the spectral placement module 710 and a first RF mixing signal (e.g., a 2.446 GHz signal generally associated with the Bluetooth communication protocol) from a

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	first local oscillator 742. The exemplary communication system 700 may also comprise a second mixer 748 that receives a second baseband signal (or a spectrally shifted second baseband signal) and a second RF mixing signal (e.g., a 2.486 GHz signal generally associated with the IEEE 802.11(g) communication protocol) from a second local oscillator 746. The exemplary communication system 700 may comprise an RF signal combiner 730 that is adapted to combine input RF signals. The RF signal combiner 730 may, for example, receive and combine the output signals from the first mixer 744 and second mixer 748 to generate an RF composite signal. The exemplary communication system 700 may also comprise a RF transmission stage 750 that receives the RF composite signal from the RF signal combiner 730 and transmit the signal. *See, e.g.*, Rofougaran at 10:18-43. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 810 comprises receiving the first baseband signal, step 810 may comprise receiving the first baseband signal in any manner generally associated with receiving a baseband signal. The first baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 810 may, for example, comprise generating the first baseband signal independently (e.g., corresponding to an independent communication). Step 810 may alternatively, for example, comprise generating the first baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first baseband signal and other baseband signals for a single communication). The exemplary method 800 may, at step 820, comprise spectrally placing (or shifting) the first baseband signal (e.g., received at step 810). Step 820 may, for example and without limitation, share any or all functional characteristics with the spectral placement modules 110-710 of the exemplary systems 100-700 illustrated in FIGS. 1-7 and discussed previously.

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	Step 820 may, for example, comprise spectrally shifting the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with a second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, step 820 may comprise implementing a frequency-hopping scheme with the first baseband signal. For example, in a scenario where there are one or more frequency bands (e.g., a second frequency space) associated with a second baseband signal, step 820 may comprise spectrally shifting the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. In another non-limiting exemplary scenario, spectrally shifting the first baseband signal may result in the production of a spectral image (e.g., frequency content mirrored about a mixing frequency utilized to spectrally shift the first baseband signal). In such a scenario, step 820 may comprise accepting or rejecting the image. In a scenario where an image is rejected, step 820 may comprise rejecting the image in any of a variety of manners. For example and without limitation, step 820 may comprise performing image reject mixing to spectrally shift the first baseband signal. Such image reject mixing generally comprises spectrally shifting a signal and rejecting an image associated with the spectrally shifted signal. Also for example, step 820 may comprise filtering out an unwanted image. The scope of various aspects of the present invention should not be limited by the utilization of image rejection or by any particular manner of performing such image rejection. The exemplary method 800 may, at step 830, comprise generating and/or receiving a second baseband signal corresponding to a second communication protocol (e.g., different from the first communication protocol). Step 830 may, for example and without limitation, share any or all functional characteristics with the second input 102 of the exemplary system 100 illustrated in FIG. 1 and discussed previously.

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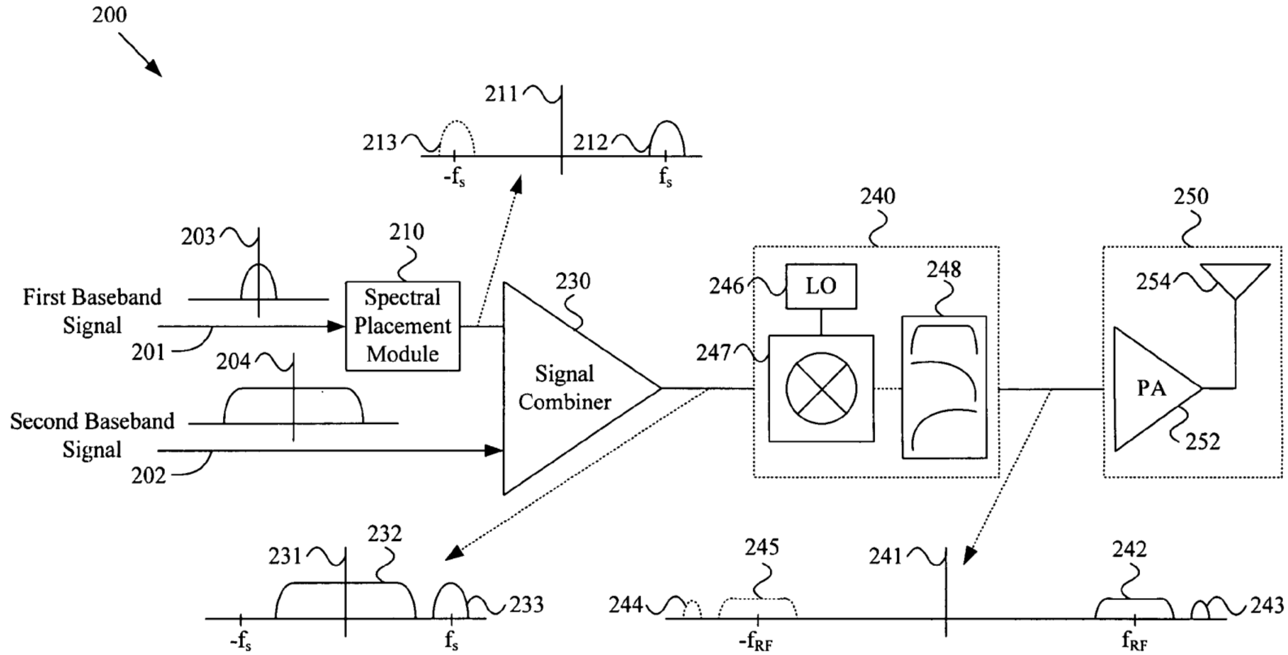
	The second baseband signal may, for example, correspond to a second communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 830 comprises receiving the second baseband signal, step 830 may comprise receiving the second baseband signal in any manner generally associated with receiving a baseband signal. The second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 830 may, for example, comprise generating the second baseband signal independently (e.g., corresponding to a communication independent of a communication associated with the first baseband signal). Step 830 may alternatively, for example, comprise generating the second baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the second baseband signal and the first baseband signal for a single communication). *See*, *e.g.*, Rofougaran at 11:53-13:4. Furthermore, this claim element is obvious in light of Rofougaran itself, when combined with any of the other references as charted for this claim element in Exs. A-1–A-31, First Supplemental Ex. A-Obviousness Chart, and/or when combined with the knowledge of one of ordinary skill in the art. Motivations to combine may come from the knowledge of the person of ordinary skill themselves, or from the known problems and predictable solutions as embodied in these references. Further motivations to combine references and additional details may be found in the Cover Pleading and First Supplemental Ex. A-Obviousness Chart.
[10.5] converting the second digital signal into a second analog signal using a second digital-to-analog converter, the second analog signal carrying the second data across a second frequency range;	Rofougaran discloses "converting the second digital signal into a second analog signal using a second digital-to-analog converter, the second analog signal carrying the second data across a second frequency range." See, e.g.:

Claim 10 of the '802 Patent	Prior Art Reference – Rofougaran
	 Figure 2 *See, e.g.*, Rofougaran at Figure 2.

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	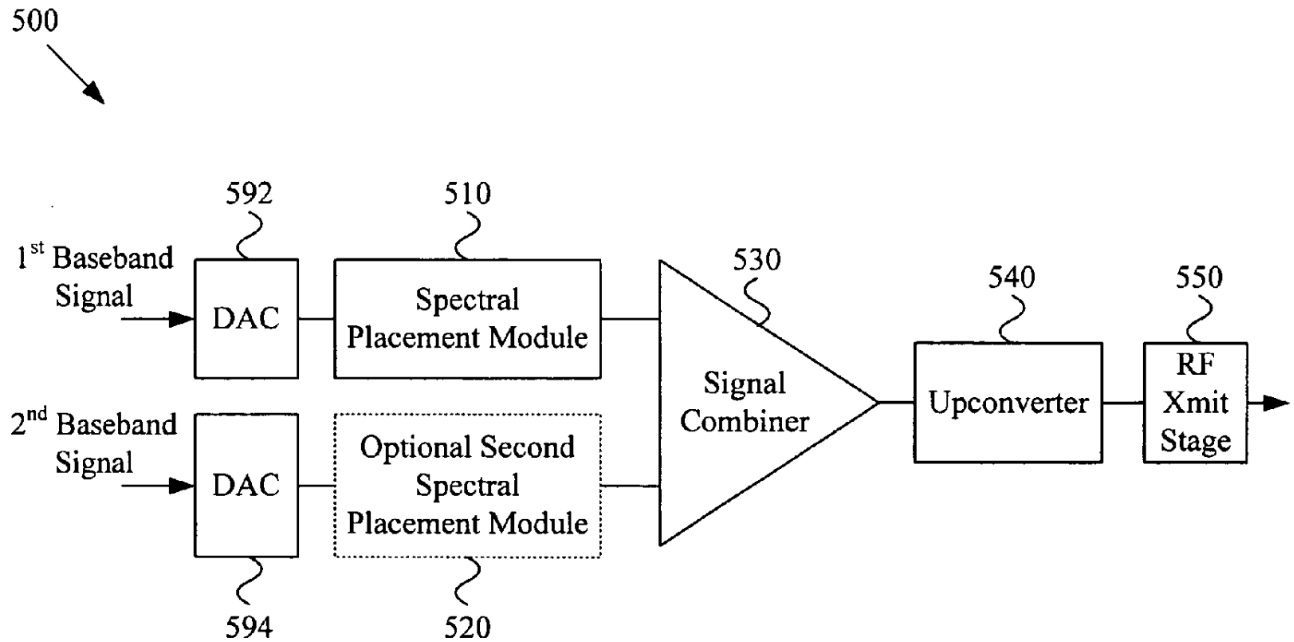 Figure 5 *See, e.g.*, Rofougaran at Figure 5.

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	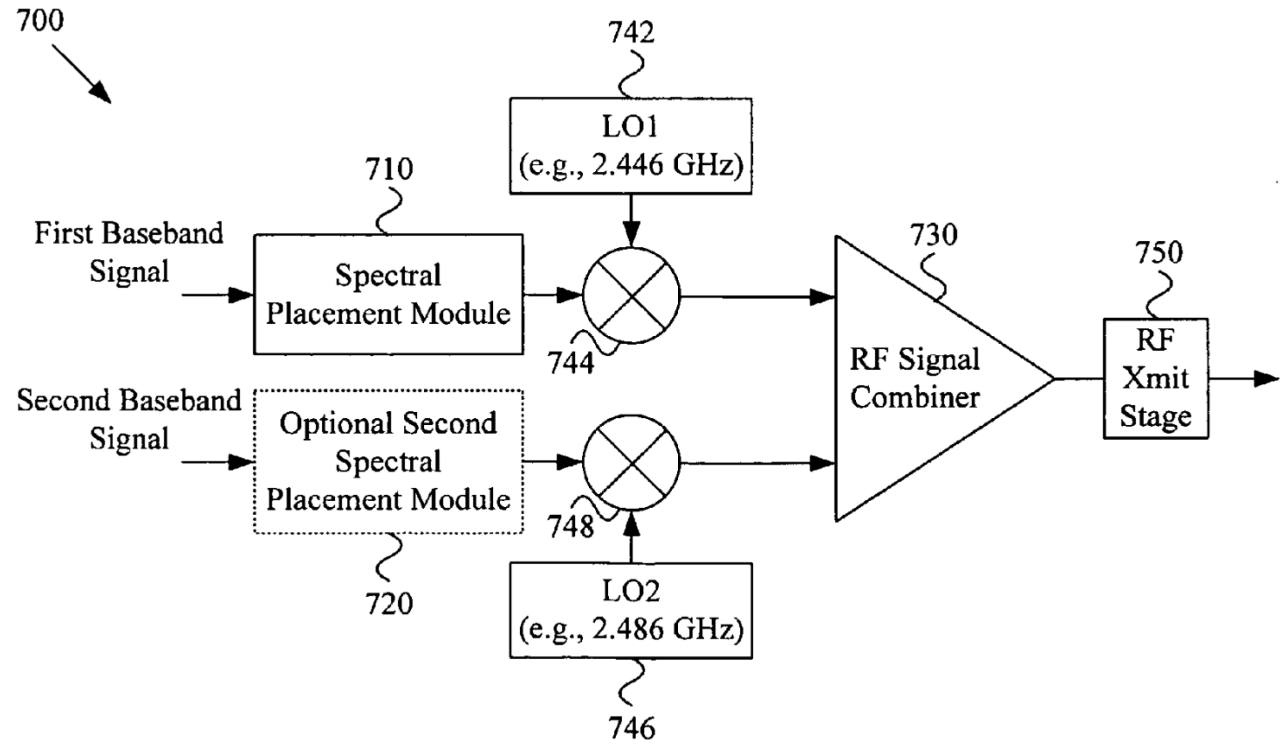 Figure 7 *See, e.g.*, Rofougaran at Figure 7. FIG. 1 is a diagram showing a portion of a first non-limiting exemplary communication system 100, in accordance with various aspects of the present invention. The communication system (or device) may comprise characteristics of any of a variety of communication systems/devices (e.g., multimode wireless communication devices). For example and without limitation, the communication system may comprise characteristics of any of a variety of mobile wireless communication devices (e.g.,

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	cellular phones, paging devices, portable email devices, etc.). Also for example, the communication system may comprise characteristics of fixed communication systems or devices (e.g., network access points, base stations, satellites, wireless routers, set top boxes, etc.). Further for example, the communication system may comprise characteristics of a variety of electronic devices with wireless communication capability (e.g., televisions, music players, cameras, remote controls, personal digital assistants, handheld computers, gaming devices, etc.). Accordingly, the scope of various aspects of the present invention should not be limited by characteristics of particular communication systems or devices. The following discussion will, at times, refer to various communication modes. A multimode communication device may, for example, be adapted to communicate in a plurality of such communication modes. For the following discussion, a communication mode may generally be considered to coincide with communication utilizing a particular communication protocol or standard. A non-limiting list of exemplary communication protocols includes various cellular communication protocols (e.g., GSM, GPRS, EDGE, CDMA, WCDMA, TDMA, PDC, etc.), various wireless networking protocols or standards, including WLAN, WMAN, WPAN and WWAN (e.g., IEEE 802.11, Bluetooth, IEEE 802.15, UWB, IEEE 802.16, IEEE 802.20, Zigbee, any WiFi protocol, etc.), various television communication standards, etc. The scope of various aspects of the present invention should not be limited by characteristics of particular communication modes or protocols, whether standard or proprietary. The exemplary communication system 100 may comprise at least a first input 101 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to any of the previously mentioned communication protocols. The exemplary communication system 100 may also comprise at least a second input 102 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first

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	communication protocol discussed above). For example and without limitation, the second baseband signal may correspond to any of the previously mentioned communication protocols. The first baseband signal and the second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of the communication system 100. For example, such modules may generate the first and second baseband signals independently (e.g., corresponding to independent respective communications). Alternatively, for example, such modules may generate the first and second baseband signals in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first and second baseband signals for a single communication). The exemplary communication system 100 may additionally comprise a spectral placement module 110 that is adapted to spectrally shift the first baseband signal (i.e., shift the frequency spectrum of the first baseband signal). In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to spectrally shift the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with the second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to implement a frequency-hopping scheme with the first baseband signal. For example, in a scenario, where there are one or more frequency bands (e.g., a second frequency space) associated with the second baseband signal, the spectral placement module 110 may be adapted to shift the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. *See, e.g.*, Rofougaran at 2:38-3:58. The exemplary communication system 100 may also comprise a second spectral placement module 120. Such a second spectral placement module 120 may, for example, share any or all characteristics

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	with the spectral placement module 110 discussed previously. The incorporation of such a second spectral placement module 120 may, for example, provide spectral shifting flexibility. For example, in such an exemplary configuration, either or both of the first and second baseband signals may be spectrally shifted to substantially distinct frequency spaces. Also for example, in such an exemplary configuration, either or both of the first and second baseband signals may be frequency hopped. Note that though the second spectral placement module 120 is illustrated separate from the first spectral placement module 110, the second spectral placement module 120 may share any or all hardware and/or software components with the spectral placement module 110. The exemplary communication system 100 may further comprise a signal combiner 130 that is adapted to generate a composite signal comprising various input signals to the signal combiner 130. For example, the composite signal may simultaneously (i.e., at an instant in time) comprise components associated with various input signals. Note that such simultaneity need not always be present. For example, at a first instant in time, the signal output from the signal combiner 130 might comprise a plurality of components associated with a plurality of respective input signals, at a second instant in time, the signal output from the signal combiner 130 might comprise a single component associated with a single respective input signal, and at a third instant in time, the signal output from the signal combiner 130 might comprise no components. In a first non-limiting exemplary scenario, the signal combiner 130 may receive a first signal that is based on the first baseband signal (e.g., associated with a first communication protocol). Also, the signal combiner 130 may receive a second signal that is based on the second baseband signal (e.g., associated with a second communication protocol). In such a scenario, the signal combiner 130 may combine the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the first baseband signal and a second signal component based on the second baseband signal. In such a scenario, for example where the frequency spectra of the first and second baseband signals do not overlap, the first and second baseband signals might not be spectrally shifted prior to combining by the signal combiner 130. In such a scenario, the spectral placement module 110 (and optionally, the second spectral placement module 120) may receive a control signal indicating whether or not to perform spectral shifting and/or to what degree spectral shifting should be implemented.

Claim 10 of the ’802 Patent	Prior Art Reference – Rofougaran
	See, e.g., Rofougaran at 4:16-67. Various components of the exemplary communication system 100 (and other communication systems illustrated and discussed herein) may be implemented in analog and/or digital circuitry. To illustrate this, the exemplary communication system 100 is not shown with analog-to-digital converters (ADCs) or digital-to-analog converters (DACs). FIGS. 4-6, to be discussed later, show various non-limiting exemplary configurations including such converters. FIG. 2 is a diagram showing a portion of a second non-limiting exemplary communication system 200, in accordance with various aspects of the present invention. The communication system 200 may, for example and without limitation, share any or all characteristics with the communication system 100 illustrated in FIG. 1 and discussed previously. The exemplary communication system 200 may comprise at least a first input 201 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to the Bluetooth communication protocol. FIG. 2 shows an exemplary frequency spectrum 203 associated with the first baseband signal. The exemplary communication system 200 may also comprise at least a second input 202 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first communication protocol discussed above). For example and without limitation, the first baseband signal may correspond to an IEEE 802.11 communication protocol (e.g., IEEE 802.11(b) or IEEE 802.11(g)). FIG. 2 shows an exemplary frequency spectrum 204 associated with the second baseband signal. *See, e.g.*, Rofougaran at 5:64-6:31.

Claim 10 of the '802 Patent	Prior Art Reference – Rofougaran
	In a non-limiting exemplary configuration illustrated in FIG. 2, the signal combiner 230 receives a first signal from the spectral placement module 210 that is based on the spectrally shifted first baseband signal. Also, the signal combiner 230 receives a second signal that is based on the second baseband signal. In such a configuration, the signal combiner 230 combines the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the spectrally shifted first baseband signal and a second signal component based on the second baseband signal (e.g., not spectrally shifted). FIG. 2 shows an exemplary frequency spectrum 231 associated with the composite signal formed by the signal combiner 230. The spectrum 231 comprises a first portion 233 corresponding to the first signal component, and a second portion 232 corresponding to the second signal component. Note that the first portion 233 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 232. The exemplary communication system 200 may also comprise an upconverter 240 adapted to upconvert a signal (e.g., the composite signal from the signal combiner 230) for transmission. The upconverter 240 may, for example and without limitation, share any or all characteristics with the upconverter 140 discussed previously. The upconverter 240 may, for example, comprise a mixer 247, a local oscillator 246 and one or more filters 248. The mixer 247 may, for example, receive the composite signal from the signal combiner 230 and an RF mixing signal at frequency fRF from a local oscillator 246. The upconverter 240 may, for example, filter the upconverted signal from the mixer 247 with one or more filters 248. The output of the upconverter 240 may, for example, comprise a signal indicative of the composite signal spectrally shifted to an RF frequency. FIG. 2 shows an exemplary frequency spectrum 241 associated with the RF signal formed by the upconverter 240. The frequency spectrum 241 comprises a first portion 243 corresponding to the first signal component and a second portion 242 corresponding to the second signal component. Note that the first portion 243 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 242. Also note that the first portion 243 and

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	second portion 242 might be formed with a first mirror portion 244 and second mirror portion 245, respectively. Note that a mirror portion may either be removed or may be kept for later processing. The exemplary communication system 200 may further comprise a RF transmission stage 250 adapted to transmit an RF signal. The RF transmission stage 250 may, for example and without limitation, share any or all characteristics with the RF transmission stage 150 discussed previously. Such an RF signal may, for example, be associated with the composite signal output from the signal combiner 230 and upconverted by the upconverter 240. The RF transmission stage 250 may, for example and without limitation, comprise a power amplifier 252, antenna 254 and other components generally associated with RF signal transmission. *See, e.g.*, Rofougaran at 6:66-7:57. For example, the spectral placement module 510, optional second spectral placement module 520 and signal combiner 530 may operate in the analog domain. The first digital-to-analog converter 592 may convert the first baseband signal to the analog domain for processing by the spectral placement module 510. The second digital-to-analog converter 594 may convert the second baseband signal to the analog domain for processing by the second spectral placement module 520 or signal combiner 530. The signal combiner 530 then combines signals in the analog domain to generate an analog composite signal, which is then upconverted and transmitted by the upconverter 540 and RF transmission stage 550, respectively. *See, e.g.*, Rofougaran at 9:30-41. FIG. 7 is a diagram showing a portion of a seventh non-limiting exemplary communication system 700, in accordance with various aspects of the present invention. The exemplary communication system 700 may, for example and without limitation, share any or all characteristics with the exemplary systems 100-600 illustrated in FIGS. 1-6 and discussed previously. The exemplary communication system 700 may comprise a first mixer 744 that receives a spectrally shifted first baseband signal from the spectral placement module 710 and a first RF mixing signal (e.g., a 2.446 GHz signal generally associated with the Bluetooth communication protocol) from a

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	first local oscillator 742. The exemplary communication system 700 may also comprise a second mixer 748 that receives a second baseband signal (or a spectrally shifted second baseband signal) and a second RF mixing signal (e.g., a 2.486 GHz signal generally associated with the IEEE 802.11(g) communication protocol) from a second local oscillator 746. The exemplary communication system 700 may comprise an RF signal combiner 730 that is adapted to combine input RF signals. The RF signal combiner 730 may, for example, receive and combine the output signals from the first mixer 744 and second mixer 748 to generate an RF composite signal. The exemplary communication system 700 may also comprise a RF transmission stage 750 that receives the RF composite signal from the RF signal combiner 730 and transmit the signal. *See, e.g.*, Rofougaran at 10:18-43. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 810 comprises receiving the first baseband signal, step 810 may comprise receiving the first baseband signal in any manner generally associated with receiving a baseband signal. The first baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 810 may, for example, comprise generating the first baseband signal independently (e.g., corresponding to an independent communication). Step 810 may alternatively, for example, comprise generating the first baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first baseband signal and other baseband signals for a single communication). The exemplary method 800 may, at step 820, comprise spectrally placing (or shifting) the first baseband signal (e.g., received at step 810). Step 820 may, for example and without limitation, share any or all functional characteristics with the spectral placement modules 110-710 of the exemplary systems 100-700 illustrated in FIGS. 1-7 and discussed previously.

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	Step 820 may, for example, comprise spectrally shifting the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with a second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, step 820 may comprise implementing a frequency-hopping scheme with the first baseband signal. For example, in a scenario where there are one or more frequency bands (e.g., a second frequency space) associated with a second baseband signal, step 820 may comprise spectrally shifting the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. In another non-limiting exemplary scenario, spectrally shifting the first baseband signal may result in the production of a spectral image (e.g., frequency content mirrored about a mixing frequency utilized to spectrally shift the first baseband signal). In such a scenario, step 820 may comprise accepting or rejecting the image. In a scenario where an image is rejected, step 820 may comprise rejecting the image in any of a variety of manners. For example and without limitation, step 820 may comprise performing image reject mixing to spectrally shift the first baseband signal. Such image reject mixing generally comprises spectrally shifting a signal and rejecting an image associated with the spectrally shifted signal. Also for example, step 820 may comprise filtering out an unwanted image. The scope of various aspects of the present invention should not be limited by the utilization of image rejection or by any particular manner of performing such image rejection. The exemplary method 800 may, at step 830, comprise generating and/or receiving a second baseband signal corresponding to a second communication protocol (e.g., different from the first communication protocol). Step 830 may, for example and without limitation, share any or all functional characteristics with the second input 102 of the exemplary system 100 illustrated in FIG. 1 and discussed previously.

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	The second baseband signal may, for example, correspond to a second communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 830 comprises receiving the second baseband signal, step 830 may comprise receiving the second baseband signal in any manner generally associated with receiving a baseband signal. The second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 830 may, for example, comprise generating the second baseband signal independently (e.g., corresponding to a communication independent of a communication associated with the first baseband signal). Step 830 may alternatively, for example, comprise generating the second baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the second baseband signal and the first baseband signal for a single communication). *See, e.g.*, Rofougaran at 11:53-13:4. Furthermore, this claim element is obvious in light of Rofougaran itself, when combined with any of the other references as charted for this claim element in Exs. A-1–A-31, First Supplemental Ex. A-Obviousness Chart, and/or when combined with the knowledge of one of ordinary skill in the art. Motivations to combine may come from the knowledge of the person of ordinary skill themselves, or from the known problems and predictable solutions as embodied in these references. Further motivations to combine references and additional details may be found in the Cover Pleading and First Supplemental Ex. A-Obviousness Chart.
[10.6] up-converting the first analog signal to a first RF center frequency to produce a first up-converted analog signal, wherein the first up-converted analog signal comprises a first up-converted frequency range from the first	Rofougaran discloses "up-converting the first analog signal to a first RF center frequency to produce a first up-converted analog signal, wherein the first up-converted analog signal comprises a first up-converted frequency range from the first RF center frequency minus one-half the first frequency range to the first RF center frequency plus one-half the first frequency range." See, e.g.:

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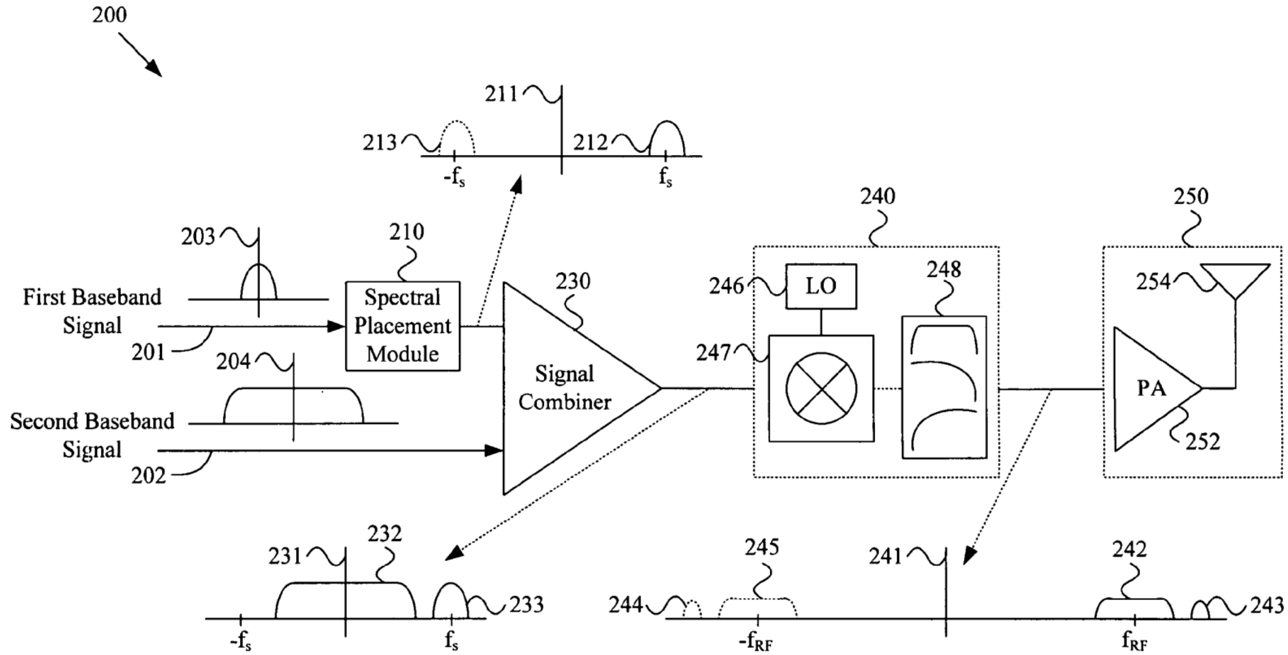
RF center frequency minus one-half the first frequency range to the first RF center frequency plus one-half the first frequency range;	 Figure 2 *See, e.g.*, Rofougaran at Figure 2.

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	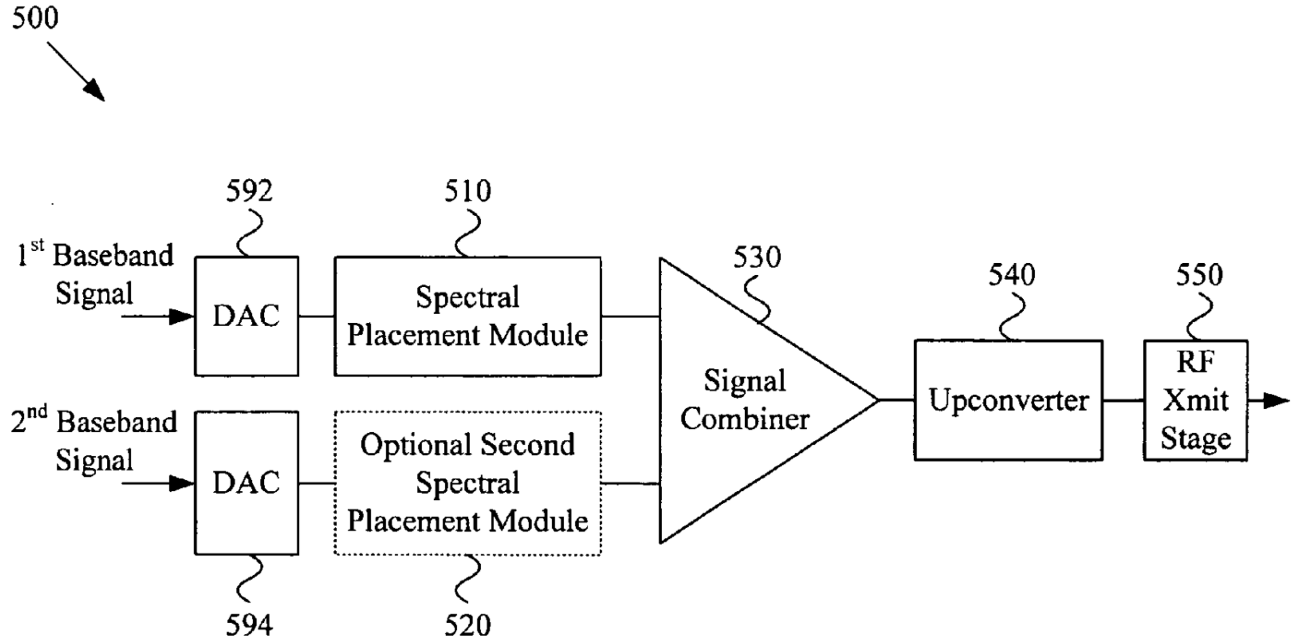 Figure 5 *See, e.g.*, Rofougaran at Figure 5.

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	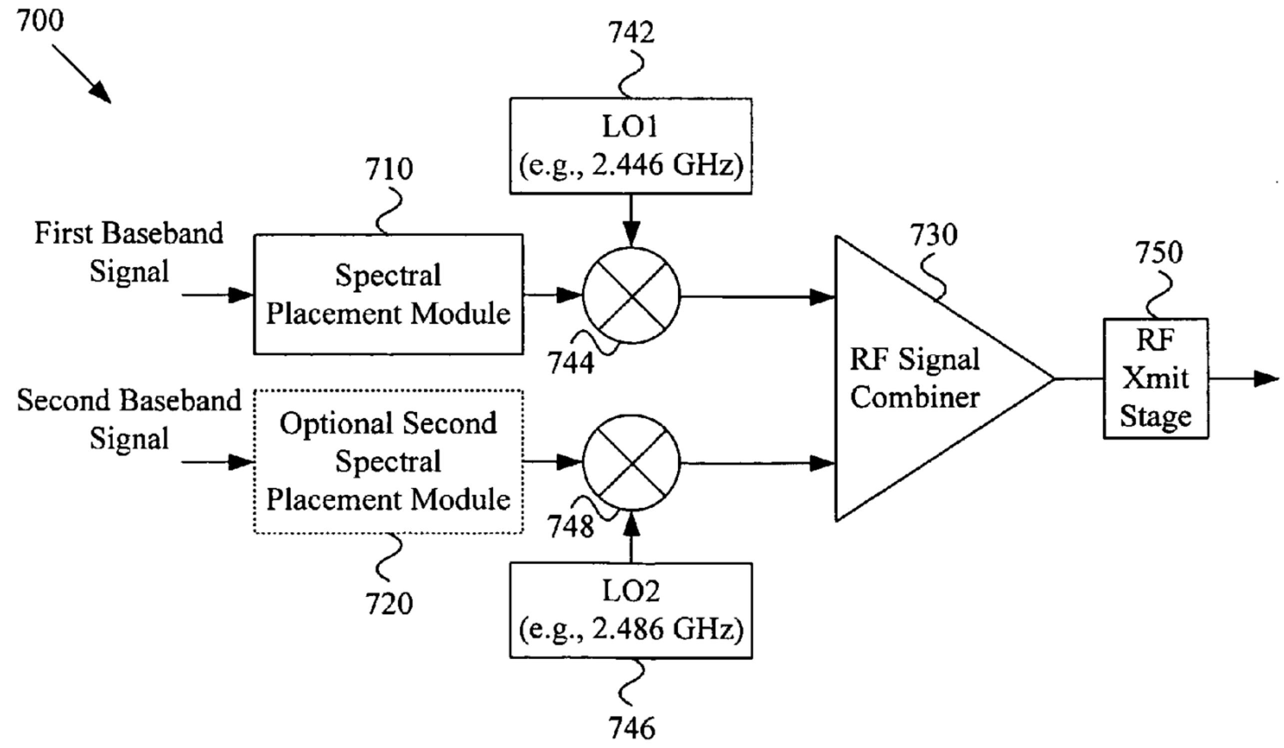 Figure 7 *See, e.g.*, Rofougaran at Figure 7. FIG. 1 is a diagram showing a portion of a first non-limiting exemplary communication system 100, in accordance with various aspects of the present invention. The communication system (or device) may comprise characteristics of any of a variety of communication systems/devices (e.g., multimode wireless communication devices). For example and without limitation, the communication system may comprise characteristics of any of a variety of mobile wireless communication devices (e.g.,

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	cellular phones, paging devices, portable email devices, etc.). Also for example, the communication system may comprise characteristics of fixed communication systems or devices (e.g., network access points, base stations, satellites, wireless routers, set top boxes, etc.). Further for example, the communication system may comprise characteristics of a variety of electronic devices with wireless communication capability (e.g., televisions, music players, cameras, remote controls, personal digital assistants, handheld computers, gaming devices, etc.). Accordingly, the scope of various aspects of the present invention should not be limited by characteristics of particular communication systems or devices. The following discussion will, at times, refer to various communication modes. A multimode communication device may, for example, be adapted to communicate in a plurality of such communication modes. For the following discussion, a communication mode may generally be considered to coincide with communication utilizing a particular communication protocol or standard. A non-limiting list of exemplary communication protocols includes various cellular communication protocols (e.g., GSM, GPRS, EDGE, CDMA, WCDMA, TDMA, PDC, etc.), various wireless networking protocols or standards, including WLAN, WMAN, WPAN and WWAN (e.g., IEEE 802.11, Bluetooth, IEEE 802.15, UWB, IEEE 802.16, IEEE 802.20, Zigbee, any WiFi protocol, etc.), various television communication standards, etc. The scope of various aspects of the present invention should not be limited by characteristics of particular communication modes or protocols, whether standard or proprietary. The exemplary communication system 100 may comprise at least a first input 101 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to any of the previously mentioned communication protocols. The exemplary communication system 100 may also comprise at least a second input 102 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first

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	communication protocol discussed above). For example and without limitation, the second baseband signal may correspond to any of the previously mentioned communication protocols. The first baseband signal and the second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of the communication system 100. For example, such modules may generate the first and second baseband signals independently (e.g., corresponding to independent respective communications). Alternatively, for example, such modules may generate the first and second baseband signals in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first and second baseband signals for a single communication). The exemplary communication system 100 may additionally comprise a spectral placement module 110 that is adapted to spectrally shift the first baseband signal (i.e., shift the frequency spectrum of the first baseband signal). In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to spectrally shift the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with the second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to implement a frequency-hopping scheme with the first baseband signal. For example, in a scenario, where there are one or more frequency bands (e.g., a second frequency space) associated with the second baseband signal, the spectral placement module 110 may be adapted to shift the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. *See, e.g.*, Rofougaran at 2:38-3:58. The exemplary communication system 100 may also comprise a second spectral placement module 120. Such a second spectral placement module 120 may, for example, share any or all characteristics

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	with the spectral placement module 110 discussed previously. The incorporation of such a second spectral placement module 120 may, for example, provide spectral shifting flexibility. For example, in such an exemplary configuration, either or both of the first and second baseband signals may be spectrally shifted to substantially distinct frequency spaces. Also for example, in such an exemplary configuration, either or both of the first and second baseband signals may be frequency hopped. Note that though the second spectral placement module 120 is illustrated separate from the first spectral placement module 110, the second spectral placement module 120 may share any or all hardware and/or software components with the spectral placement module 110. The exemplary communication system 100 may further comprise a signal combiner 130 that is adapted to generate a composite signal comprising various input signals to the signal combiner 130. For example, the composite signal may simultaneously (i.e., at an instant in time) comprise components associated with various input signals. Note that such simultaneity need not always be present. For example, at a first instant in time, the signal output from the signal combiner 130 might comprise a plurality of components associated with a plurality of respective input signals, at a second instant in time, the signal output from the signal combiner 130 might comprise a single component associated with a single respective input signal, and at a third instant in time, the signal output from the signal combiner 130 might comprise no components. In a first non-limiting exemplary scenario, the signal combiner 130 may receive a first signal that is based on the first baseband signal (e.g., associated with a first communication protocol). Also, the signal combiner 130 may receive a second signal that is based on the second baseband signal (e.g., associated with a second communication protocol). In such a scenario, the signal combiner 130 may combine the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the first baseband signal and a second signal component based on the second baseband signal. In such a scenario, for example where the frequency spectra of the first and second baseband signals do not overlap, the first and second baseband signals might not be spectrally shifted prior to combining by the signal combiner 130. In such a scenario, the spectral placement module 110 (and optionally, the second spectral placement module 120) may receive a control signal indicating whether or not to perform spectral shifting and/or to what degree spectral shifting should be implemented.

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	See, e.g., Rofougaran at 4:16-67. Various components of the exemplary communication system 100 (and other communication systems illustrated and discussed herein) may be implemented in analog and/or digital circuitry. To illustrate this, the exemplary communication system 100 is not shown with analog-to-digital converters (ADCs) or digital-to-analog converters (DACs). FIGS. 4-6, to be discussed later, show various non-limiting exemplary configurations including such converters. FIG. 2 is a diagram showing a portion of a second non-limiting exemplary communication system 200, in accordance with various aspects of the present invention. The communication system 200 may, for example and without limitation, share any or all characteristics with the communication system 100 illustrated in FIG. 1 and discussed previously. The exemplary communication system 200 may comprise at least a first input 201 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to the Bluetooth communication protocol. FIG. 2 shows an exemplary frequency spectrum 203 associated with the first baseband signal. The exemplary communication system 200 may also comprise at least a second input 202 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first communication protocol discussed above). For example and without limitation, the first baseband signal may correspond to an IEEE 802.11 communication protocol (e.g., IEEE 802.11(b) or IEEE 802.11(g)). FIG. 2 shows an exemplary frequency spectrum 204 associated with the second baseband signal. *See, e.g.*, Rofougaran at 5:64-6:31.

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	In a non-limiting exemplary configuration illustrated in FIG. 2, the signal combiner 230 receives a first signal from the spectral placement module 210 that is based on the spectrally shifted first baseband signal. Also, the signal combiner 230 receives a second signal that is based on the second baseband signal. In such a configuration, the signal combiner 230 combines the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the spectrally shifted first baseband signal and a second signal component based on the second baseband signal (e.g., not spectrally shifted). FIG. 2 shows an exemplary frequency spectrum 231 associated with the composite signal formed by the signal combiner 230. The spectrum 231 comprises a first portion 233 corresponding to the first signal component, and a second portion 232 corresponding to the second signal component. Note that the first portion 233 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 232. The exemplary communication system 200 may also comprise an upconverter 240 adapted to upconvert a signal (e.g., the composite signal from the signal combiner 230) for transmission. The upconverter 240 may, for example and without limitation, share any or all characteristics with the upconverter 140 discussed previously. The upconverter 240 may, for example, comprise a mixer 247, a local oscillator 246 and one or more filters 248. The mixer 247 may, for example, receive the composite signal from the signal combiner 230 and an RF mixing signal at frequency fRF from a local oscillator 246. The upconverter 240 may, for example, filter the upconverted signal from the mixer 247 with one or more filters 248. The output of the upconverter 240 may, for example, comprise a signal indicative of the composite signal spectrally shifted to an RF frequency. FIG. 2 shows an exemplary frequency spectrum 241 associated with the RF signal formed by the upconverter 240. The frequency spectrum 241 comprises a first portion 243 corresponding to the first signal component and a second portion 242 corresponding to the second signal component. Note that the first portion 243 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 242. Also note that the first portion 243 and

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	second portion 242 might be formed with a first mirror portion 244 and second mirror portion 245, respectively. Note that a mirror portion may either be removed or may be kept for later processing. The exemplary communication system 200 may further comprise a RF transmission stage 250 adapted to transmit an RF signal. The RF transmission stage 250 may, for example and without limitation, share any or all characteristics with the RF transmission stage 150 discussed previously. Such an RF signal may, for example, be associated with the composite signal output from the signal combiner 230 and upconverted by the upconverter 240. The RF transmission stage 250 may, for example and without limitation, comprise a power amplifier 252, antenna 254 and other components generally associated with RF signal transmission. *See, e.g.*, Rofougaran at 6:66-7:57. For example, the spectral placement module 510, optional second spectral placement module 520 and signal combiner 530 may operate in the analog domain. The first digital-to-analog converter 592 may convert the first baseband signal to the analog domain for processing by the spectral placement module 510. The second digital-to-analog converter 594 may convert the second baseband signal to the analog domain for processing by the second spectral placement module 520 or signal combiner 530. The signal combiner 530 then combines signals in the analog domain to generate an analog composite signal, which is then upconverted and transmitted by the upconverter 540 and RF transmission stage 550, respectively. *See, e.g.*, Rofougaran at 9:30-41. FIG. 7 is a diagram showing a portion of a seventh non-limiting exemplary communication system 700, in accordance with various aspects of the present invention. The exemplary communication system 700 may, for example and without limitation, share any or all characteristics with the exemplary systems 100-600 illustrated in FIGS. 1-6 and discussed previously. The exemplary communication system 700 may comprise a first mixer 744 that receives a spectrally shifted first baseband signal from the spectral placement module 710 and a first RF mixing signal (e.g., a 2.446 GHz signal generally associated with the Bluetooth communication protocol) from a

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	first local oscillator 742. The exemplary communication system 700 may also comprise a second mixer 748 that receives a second baseband signal (or a spectrally shifted second baseband signal) and a second RF mixing signal (e.g., a 2.486 GHz signal generally associated with the IEEE 802.11(g) communication protocol) from a second local oscillator 746. The exemplary communication system 700 may comprise an RF signal combiner 730 that is adapted to combine input RF signals. The RF signal combiner 730 may, for example, receive and combine the output signals from the first mixer 744 and second mixer 748 to generate an RF composite signal. The exemplary communication system 700 may also comprise a RF transmission stage 750 that receives the RF composite signal from the RF signal combiner 730 and transmit the signal. *See, e.g.*, Rofougaran at 10:18-43. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 810 comprises receiving the first baseband signal, step 810 may comprise receiving the first baseband signal in any manner generally associated with receiving a baseband signal. The first baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 810 may, for example, comprise generating the first baseband signal independently (e.g., corresponding to an independent communication). Step 810 may alternatively, for example, comprise generating the first baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first baseband signal and other baseband signals for a single communication). The exemplary method 800 may, at step 820, comprise spectrally placing (or shifting) the first baseband signal (e.g., received at step 810). Step 820 may, for example and without limitation, share any or all functional characteristics with the spectral placement modules 110-710 of the exemplary systems 100-700 illustrated in FIGS. 1-7 and discussed previously.

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	Step 820 may, for example, comprise spectrally shifting the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with a second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, step 820 may comprise implementing a frequency-hopping scheme with the first baseband signal. For example, in a scenario where there are one or more frequency bands (e.g., a second frequency space) associated with a second baseband signal, step 820 may comprise spectrally shifting the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. In another non-limiting exemplary scenario, spectrally shifting the first baseband signal may result in the production of a spectral image (e.g., frequency content mirrored about a mixing frequency utilized to spectrally shift the first baseband signal). In such a scenario, step 820 may comprise accepting or rejecting the image. In a scenario where an image is rejected, step 820 may comprise rejecting the image in any of a variety of manners. For example and without limitation, step 820 may comprise performing image reject mixing to spectrally shift the first baseband signal. Such image reject mixing generally comprises spectrally shifting a signal and rejecting an image associated with the spectrally shifted signal. Also for example, step 820 may comprise filtering out an unwanted image. The scope of various aspects of the present invention should not be limited by the utilization of image rejection or by any particular manner of performing such image rejection. The exemplary method 800 may, at step 830, comprise generating and/or receiving a second baseband signal corresponding to a second communication protocol (e.g., different from the first communication protocol). Step 830 may, for example and without limitation, share any or all functional characteristics with the second input 102 of the exemplary system 100 illustrated in FIG. 1 and discussed previously.

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	The second baseband signal may, for example, correspond to a second communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 830 comprises receiving the second baseband signal, step 830 may comprise receiving the second baseband signal in any manner generally associated with receiving a baseband signal. The second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 830 may, for example, comprise generating the second baseband signal independently (e.g., corresponding to a communication independent of a communication associated with the first baseband signal). Step 830 may alternatively, for example, comprise generating the second baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the second baseband signal and the first baseband signal for a single communication). *See*, *e.g.*, Rofougaran at 11:53-13:4. Furthermore, this claim element is obvious in light of Rofougaran itself, when combined with any of the other references as charted for this claim element in Exs. A-1–A-31, First Supplemental Ex. A-Obviousness Chart, and/or when combined with the knowledge of one of ordinary skill in the art. Motivations to combine may come from the knowledge of the person of ordinary skill themselves, or from the known problems and predictable solutions as embodied in these references. Further motivations to combine references and additional details may be found in the Cover Pleading and First Supplemental Ex. A-Obviousness Chart.
[10.7] up-converting the second analog signal to a second RF center frequency greater than the first center RF frequency to produce a second up-converted analog signal, wherein the second up-converted analog signal	Rofougaran discloses “up-converting the second analog signal to a second RF center frequency greater than the first center RF frequency to produce a second up-converted analog signal, wherein the second up-converted analog signal comprises a second up-converted frequency range from the second RF center frequency minus one-half the second frequency range to the second RF center frequency plus one-half the second frequency range, and wherein a frequency difference between the first RF center frequency and the second RF center frequency is greater than the sum of one-half the first frequency range and one-half the second frequency range.” See, e.g.:

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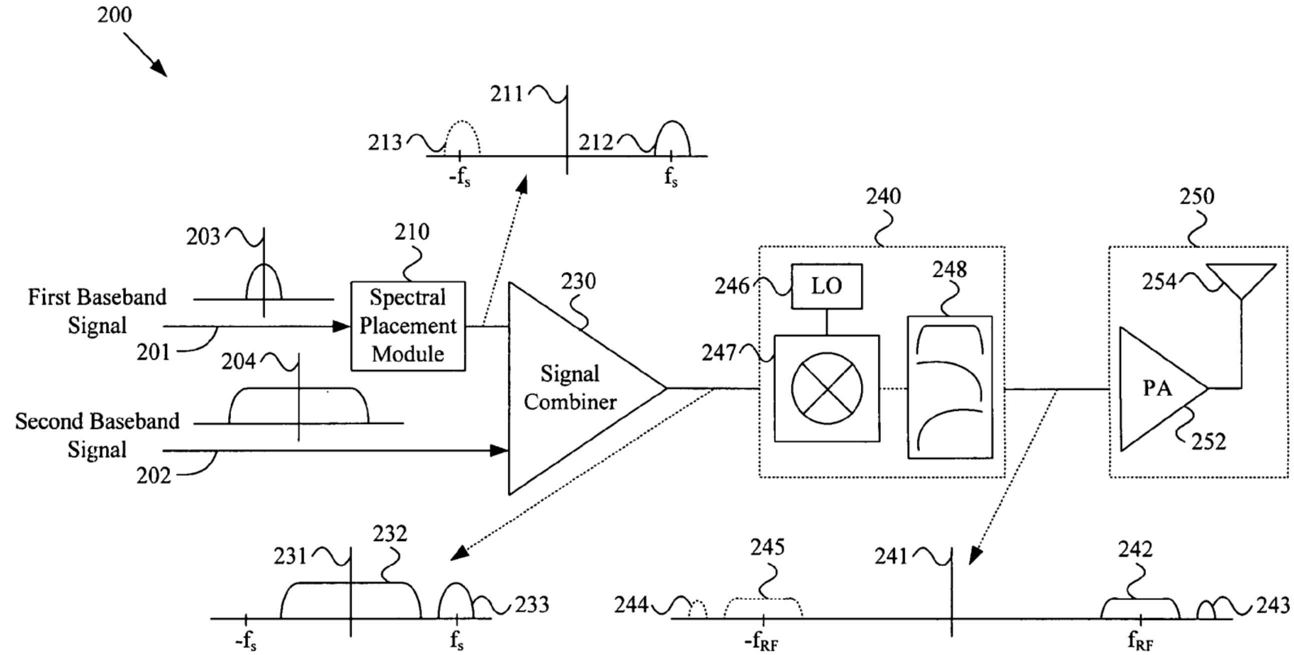
comprises a second up-converted frequency range from the second RF center frequency minus one-half the second frequency range to the second RF center frequency plus one-half the second frequency range, and wherein a frequency difference between the first RF center frequency and the second RF center frequency is greater than the sum of one-half the first frequency range and one-half the second frequency range;	 Figure 2 *See, e.g.*, Rofougaran at Figure 2.

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	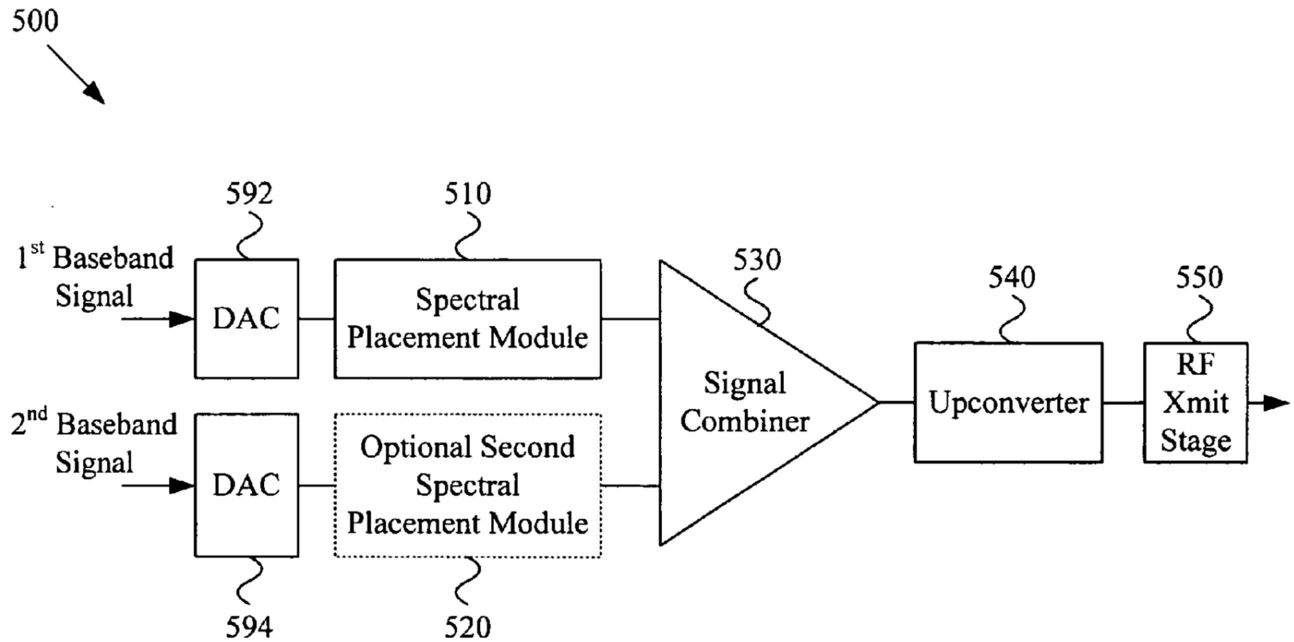 Figure 5 *See, e.g.*, Rofougaran at Figure 5.

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	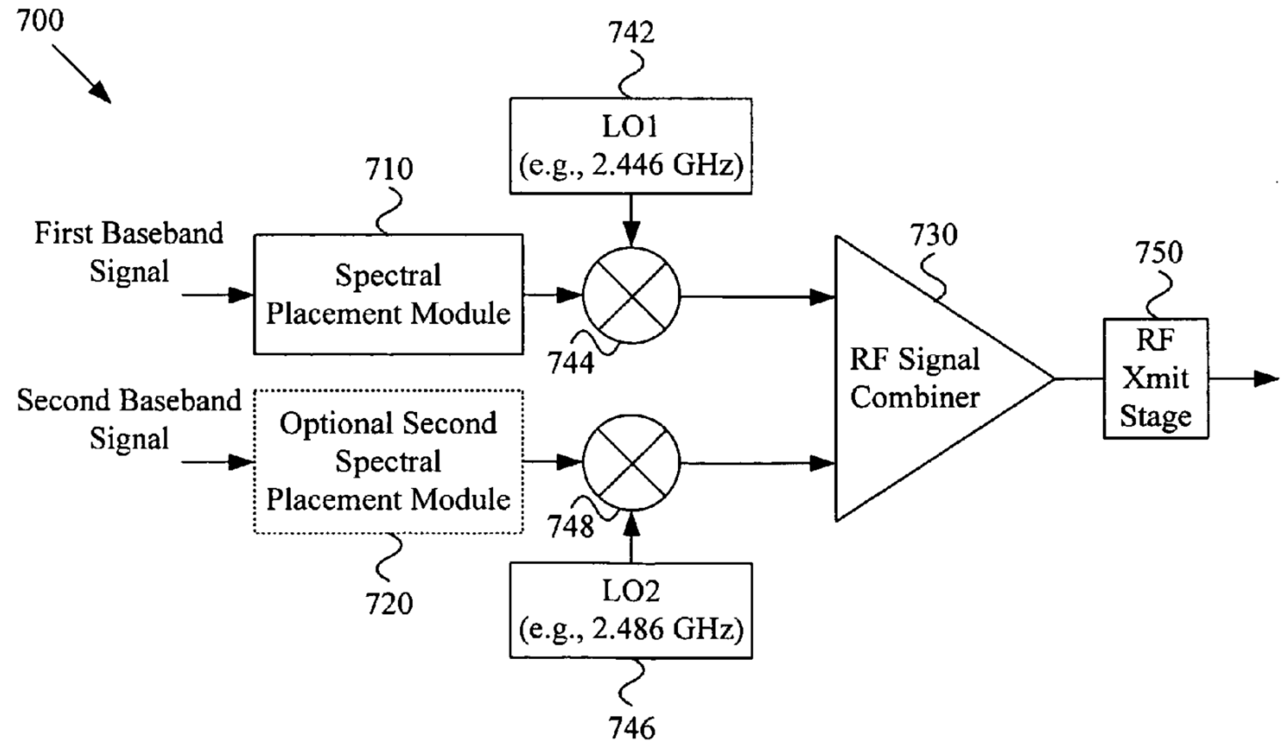 Figure 7 *See, e.g.*, Rofougaran at Figure 7. FIG. 1 is a diagram showing a portion of a first non-limiting exemplary communication system 100, in accordance with various aspects of the present invention. The communication system (or device) may comprise characteristics of any of a variety of communication systems/devices (e.g., multimode wireless communication devices). For example and without limitation, the communication system may comprise characteristics of any of a variety of mobile wireless communication devices (e.g.,

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	cellular phones, paging devices, portable email devices, etc.). Also for example, the communication system may comprise characteristics of fixed communication systems or devices (e.g., network access points, base stations, satellites, wireless routers, set top boxes, etc.). Further for example, the communication system may comprise characteristics of a variety of electronic devices with wireless communication capability (e.g., televisions, music players, cameras, remote controls, personal digital assistants, handheld computers, gaming devices, etc.). Accordingly, the scope of various aspects of the present invention should not be limited by characteristics of particular communication systems or devices. The following discussion will, at times, refer to various communication modes. A multimode communication device may, for example, be adapted to communicate in a plurality of such communication modes. For the following discussion, a communication mode may generally be considered to coincide with communication utilizing a particular communication protocol or standard. A non-limiting list of exemplary communication protocols includes various cellular communication protocols (e.g., GSM, GPRS, EDGE, CDMA, WCDMA, TDMA, PDC, etc.), various wireless networking protocols or standards, including WLAN, WMAN, WPAN and WWAN (e.g., IEEE 802.11, Bluetooth, IEEE 802.15, UWB, IEEE 802.16, IEEE 802.20, Zigbee, any WiFi protocol, etc.), various television communication standards, etc. The scope of various aspects of the present invention should not be limited by characteristics of particular communication modes or protocols, whether standard or proprietary. The exemplary communication system 100 may comprise at least a first input 101 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to any of the previously mentioned communication protocols. The exemplary communication system 100 may also comprise at least a second input 102 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first

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	communication protocol discussed above). For example and without limitation, the second baseband signal may correspond to any of the previously mentioned communication protocols. The first baseband signal and the second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of the communication system 100. For example, such modules may generate the first and second baseband signals independently (e.g., corresponding to independent respective communications). Alternatively, for example, such modules may generate the first and second baseband signals in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first and second baseband signals for a single communication). The exemplary communication system 100 may additionally comprise a spectral placement module 110 that is adapted to spectrally shift the first baseband signal (i.e., shift the frequency spectrum of the first baseband signal). In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to spectrally shift the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with the second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to implement a frequency-hopping scheme with the first baseband signal. For example, in a scenario, where there are one or more frequency bands (e.g., a second frequency space) associated with the second baseband signal, the spectral placement module 110 may be adapted to shift the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. *See, e.g.*, Rofougaran at 2:38-3:58. The exemplary communication system 100 may also comprise a second spectral placement module 120. Such a second spectral placement module 120 may, for example, share any or all characteristics

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	with the spectral placement module 110 discussed previously. The incorporation of such a second spectral placement module 120 may, for example, provide spectral shifting flexibility. For example, in such an exemplary configuration, either or both of the first and second baseband signals may be spectrally shifted to substantially distinct frequency spaces. Also for example, in such an exemplary configuration, either or both of the first and second baseband signals may be frequency hopped. Note that though the second spectral placement module 120 is illustrated separate from the first spectral placement module 110, the second spectral placement module 120 may share any or all hardware and/or software components with the spectral placement module 110. The exemplary communication system 100 may further comprise a signal combiner 130 that is adapted to generate a composite signal comprising various input signals to the signal combiner 130. For example, the composite signal may simultaneously (i.e., at an instant in time) comprise components associated with various input signals. Note that such simultaneity need not always be present. For example, at a first instant in time, the signal output from the signal combiner 130 might comprise a plurality of components associated with a plurality of respective input signals, at a second instant in time, the signal output from the signal combiner 130 might comprise a single component associated with a single respective input signal, and at a third instant in time, the signal output from the signal combiner 130 might comprise no components. In a first non-limiting exemplary scenario, the signal combiner 130 may receive a first signal that is based on the first baseband signal (e.g., associated with a first communication protocol). Also, the signal combiner 130 may receive a second signal that is based on the second baseband signal (e.g., associated with a second communication protocol). In such a scenario, the signal combiner 130 may combine the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the first baseband signal and a second signal component based on the second baseband signal. In such a scenario, for example where the frequency spectra of the first and second baseband signals do not overlap, the first and second baseband signals might not be spectrally shifted prior to combining by the signal combiner 130. In such a scenario, the spectral placement module 110 (and optionally, the second spectral placement module 120) may receive a control signal indicating whether or not to perform spectral shifting and/or to what degree spectral shifting should be implemented.

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	See, e.g., Rofougaran at 4:16-67. Various components of the exemplary communication system 100 (and other communication systems illustrated and discussed herein) may be implemented in analog and/or digital circuitry. To illustrate this, the exemplary communication system 100 is not shown with analog-to-digital converters (ADCs) or digital-to-analog converters (DACs). FIGS. 4-6, to be discussed later, show various non-limiting exemplary configurations including such converters. FIG. 2 is a diagram showing a portion of a second non-limiting exemplary communication system 200, in accordance with various aspects of the present invention. The communication system 200 may, for example and without limitation, share any or all characteristics with the communication system 100 illustrated in FIG. 1 and discussed previously. The exemplary communication system 200 may comprise at least a first input 201 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to the Bluetooth communication protocol. FIG. 2 shows an exemplary frequency spectrum 203 associated with the first baseband signal. The exemplary communication system 200 may also comprise at least a second input 202 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first communication protocol discussed above). For example and without limitation, the first baseband signal may correspond to an IEEE 802.11 communication protocol (e.g., IEEE 802.11(b) or IEEE 802.11(g)). FIG. 2 shows an exemplary frequency spectrum 204 associated with the second baseband signal. *See, e.g.*, Rofougaran at 5:64-6:31.

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	In a non-limiting exemplary configuration illustrated in FIG. 2, the signal combiner 230 receives a first signal from the spectral placement module 210 that is based on the spectrally shifted first baseband signal. Also, the signal combiner 230 receives a second signal that is based on the second baseband signal. In such a configuration, the signal combiner 230 combines the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the spectrally shifted first baseband signal and a second signal component based on the second baseband signal (e.g., not spectrally shifted). FIG. 2 shows an exemplary frequency spectrum 231 associated with the composite signal formed by the signal combiner 230. The spectrum 231 comprises a first portion 233 corresponding to the first signal component, and a second portion 232 corresponding to the second signal component. Note that the first portion 233 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 232. The exemplary communication system 200 may also comprise an upconverter 240 adapted to upconvert a signal (e.g., the composite signal from the signal combiner 230) for transmission. The upconverter 240 may, for example and without limitation, share any or all characteristics with the upconverter 140 discussed previously. The upconverter 240 may, for example, comprise a mixer 247, a local oscillator 246 and one or more filters 248. The mixer 247 may, for example, receive the composite signal from the signal combiner 230 and an RF mixing signal at frequency fRF from a local oscillator 246. The upconverter 240 may, for example, filter the upconverted signal from the mixer 247 with one or more filters 248. The output of the upconverter 240 may, for example, comprise a signal indicative of the composite signal spectrally shifted to an RF frequency. FIG. 2 shows an exemplary frequency spectrum 241 associated with the RF signal formed by the upconverter 240. The frequency spectrum 241 comprises a first portion 243 corresponding to the first signal component and a second portion 242 corresponding to the second signal component. Note that the first portion 243 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 242. Also note that the first portion 243 and

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	second portion 242 might be formed with a first mirror portion 244 and second mirror portion 245, respectively. Note that a mirror portion may either be removed or may be kept for later processing. The exemplary communication system 200 may further comprise a RF transmission stage 250 adapted to transmit an RF signal. The RF transmission stage 250 may, for example and without limitation, share any or all characteristics with the RF transmission stage 150 discussed previously. Such an RF signal may, for example, be associated with the composite signal output from the signal combiner 230 and upconverted by the upconverter 240. The RF transmission stage 250 may, for example and without limitation, comprise a power amplifier 252, antenna 254 and other components generally associated with RF signal transmission. *See, e.g.*, Rofougaran at 6:66-7:57. For example, the spectral placement module 510, optional second spectral placement module 520 and signal combiner 530 may operate in the analog domain. The first digital-to-analog converter 592 may convert the first baseband signal to the analog domain for processing by the spectral placement module 510. The second digital-to-analog converter 594 may convert the second baseband signal to the analog domain for processing by the second spectral placement module 520 or signal combiner 530. The signal combiner 530 then combines signals in the analog domain to generate an analog composite signal, which is then upconverted and transmitted by the upconverter 540 and RF transmission stage 550, respectively. *See, e.g.*, Rofougaran at 9:30-41. FIG. 7 is a diagram showing a portion of a seventh non-limiting exemplary communication system 700, in accordance with various aspects of the present invention. The exemplary communication system 700 may, for example and without limitation, share any or all characteristics with the exemplary systems 100-600 illustrated in FIGS. 1-6 and discussed previously. The exemplary communication system 700 may comprise a first mixer 744 that receives a spectrally shifted first baseband signal from the spectral placement module 710 and a first RF mixing signal (e.g., a 2.446 GHz signal generally associated with the Bluetooth communication protocol) from a

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	first local oscillator 742. The exemplary communication system 700 may also comprise a second mixer 748 that receives a second baseband signal (or a spectrally shifted second baseband signal) and a second RF mixing signal (e.g., a 2.486 GHz signal generally associated with the IEEE 802.11(g) communication protocol) from a second local oscillator 746. The exemplary communication system 700 may comprise an RF signal combiner 730 that is adapted to combine input RF signals. The RF signal combiner 730 may, for example, receive and combine the output signals from the first mixer 744 and second mixer 748 to generate an RF composite signal. The exemplary communication system 700 may also comprise a RF transmission stage 750 that receives the RF composite signal from the RF signal combiner 730 and transmit the signal. *See, e.g.*, Rofougaran at 10:18-43. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 810 comprises receiving the first baseband signal, step 810 may comprise receiving the first baseband signal in any manner generally associated with receiving a baseband signal. The first baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 810 may, for example, comprise generating the first baseband signal independently (e.g., corresponding to an independent communication). Step 810 may alternatively, for example, comprise generating the first baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first baseband signal and other baseband signals for a single communication). The exemplary method 800 may, at step 820, comprise spectrally placing (or shifting) the first baseband signal (e.g., received at step 810). Step 820 may, for example and without limitation, share any or all functional characteristics with the spectral placement modules 110-710 of the exemplary systems 100-700 illustrated in FIGS. 1-7 and discussed previously.

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	Step 820 may, for example, comprise spectrally shifting the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with a second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, step 820 may comprise implementing a frequency-hopping scheme with the first baseband signal. For example, in a scenario where there are one or more frequency bands (e.g., a second frequency space) associated with a second baseband signal, step 820 may comprise spectrally shifting the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. In another non-limiting exemplary scenario, spectrally shifting the first baseband signal may result in the production of a spectral image (e.g., frequency content mirrored about a mixing frequency utilized to spectrally shift the first baseband signal). In such a scenario, step 820 may comprise accepting or rejecting the image. In a scenario where an image is rejected, step 820 may comprise rejecting the image in any of a variety of manners. For example and without limitation, step 820 may comprise performing image reject mixing to spectrally shift the first baseband signal. Such image reject mixing generally comprises spectrally shifting a signal and rejecting an image associated with the spectrally shifted signal. Also for example, step 820 may comprise filtering out an unwanted image. The scope of various aspects of the present invention should not be limited by the utilization of image rejection or by any particular manner of performing such image rejection. The exemplary method 800 may, at step 830, comprise generating and/or receiving a second baseband signal corresponding to a second communication protocol (e.g., different from the first communication protocol). Step 830 may, for example and without limitation, share any or all functional characteristics with the second input 102 of the exemplary system 100 illustrated in FIG. 1 and discussed previously.

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	The second baseband signal may, for example, correspond to a second communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 830 comprises receiving the second baseband signal, step 830 may comprise receiving the second baseband signal in any manner generally associated with receiving a baseband signal. The second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 830 may, for example, comprise generating the second baseband signal independently (e.g., corresponding to a communication independent of a communication associated with the first baseband signal). Step 830 may alternatively, for example, comprise generating the second baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the second baseband signal and the first baseband signal for a single communication). *See*, *e.g.*, Rofougaran at 11:53-13:4. Furthermore, this claim element is obvious in light of Rofougaran itself, when combined with any of the other references as charted for this claim element in Exs. A-1–A-31, First Supplemental Ex. A-Obviousness Chart, and/or when combined with the knowledge of one of ordinary skill in the art. Motivations to combine may come from the knowledge of the person of ordinary skill themselves, or from the known problems and predictable solutions as embodied in these references. Further motivations to combine references and additional details may be found in the Cover Pleading and First Supplemental Ex. A-Obviousness Chart.
[10.8] combining the first up-converted analog signal and the second up-converted analog signal to produce a combined up-converted signal;	Rofougaran discloses “combining the first up-converted analog signal and the second up-converted analog signal to produce a combined up-converted signal.” See, e.g.:

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	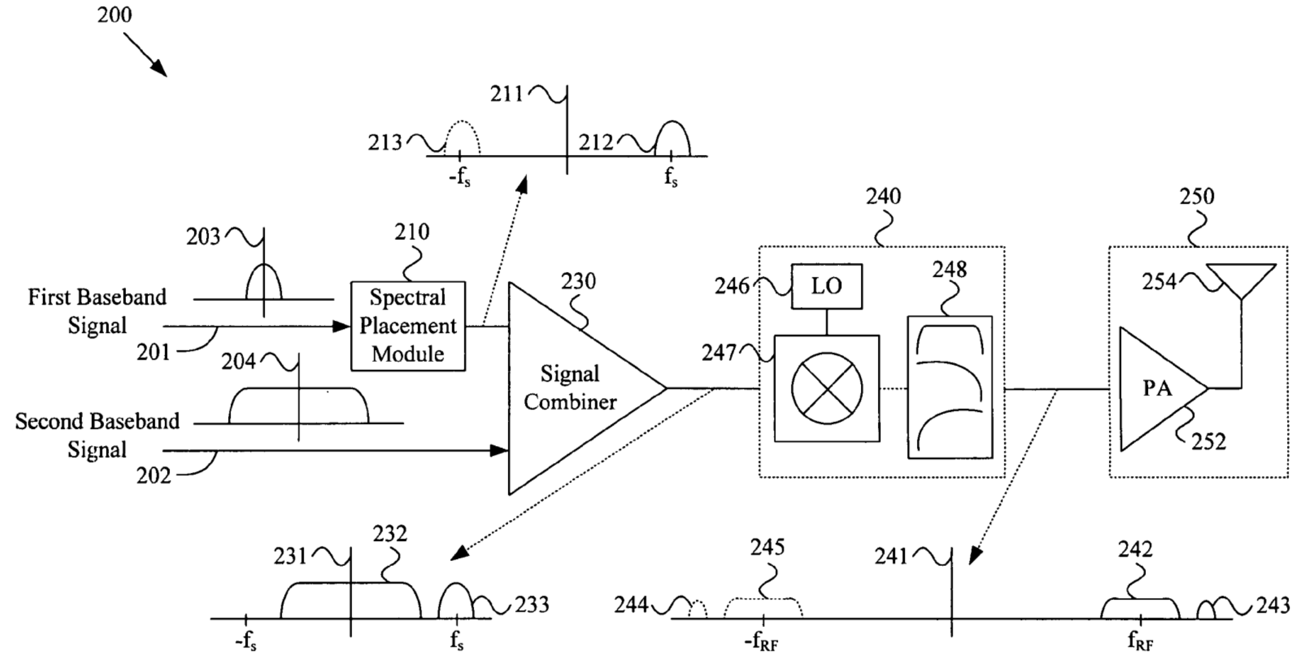 Figure 2 *See, e.g.*, Rofougaran at Figure 2.

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	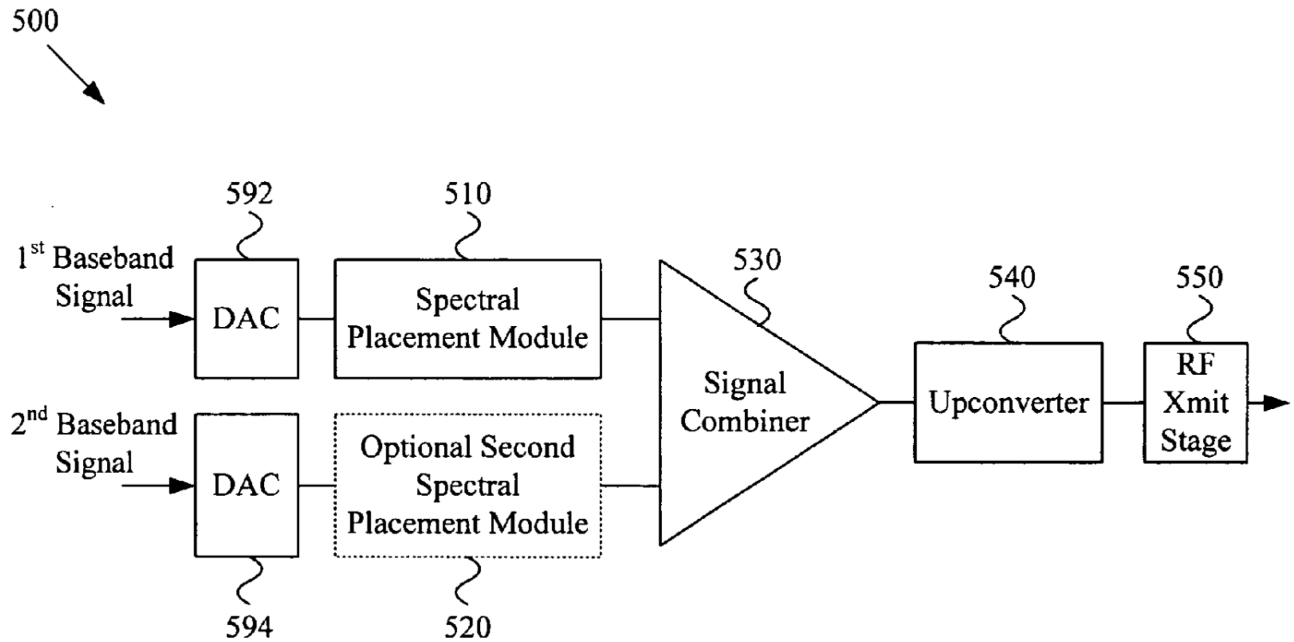 Figure 5 *See, e.g.*, Rofougaran at Figure 5.

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	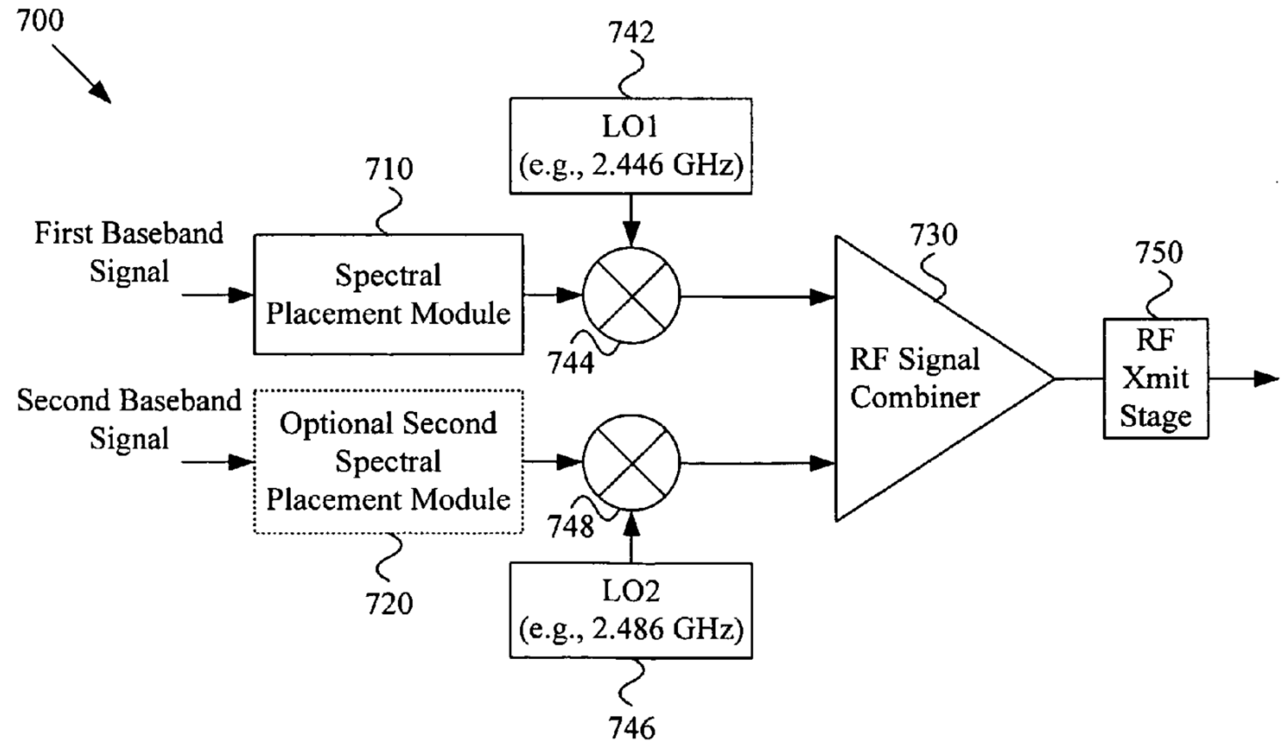 Figure 7 *See, e.g.*, Rofougaran at Figure 7. FIG. 1 is a diagram showing a portion of a first non-limiting exemplary communication system 100, in accordance with various aspects of the present invention. The communication system (or device) may comprise characteristics of any of a variety of communication systems/devices (e.g., multimode wireless communication devices). For example and without limitation, the communication system may comprise characteristics of any of a variety of mobile wireless communication devices (e.g.,

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	cellular phones, paging devices, portable email devices, etc.). Also for example, the communication system may comprise characteristics of fixed communication systems or devices (e.g., network access points, base stations, satellites, wireless routers, set top boxes, etc.). Further for example, the communication system may comprise characteristics of a variety of electronic devices with wireless communication capability (e.g., televisions, music players, cameras, remote controls, personal digital assistants, handheld computers, gaming devices, etc.). Accordingly, the scope of various aspects of the present invention should not be limited by characteristics of particular communication systems or devices. The following discussion will, at times, refer to various communication modes. A multimode communication device may, for example, be adapted to communicate in a plurality of such communication modes. For the following discussion, a communication mode may generally be considered to coincide with communication utilizing a particular communication protocol or standard. A non-limiting list of exemplary communication protocols includes various cellular communication protocols (e.g., GSM, GPRS, EDGE, CDMA, WCDMA, TDMA, PDC, etc.), various wireless networking protocols or standards, including WLAN, WMAN, WPAN and WWAN (e.g., IEEE 802.11, Bluetooth, IEEE 802.15, UWB, IEEE 802.16, IEEE 802.20, Zigbee, any WiFi protocol, etc.), various television communication standards, etc. The scope of various aspects of the present invention should not be limited by characteristics of particular communication modes or protocols, whether standard or proprietary. The exemplary communication system 100 may comprise at least a first input 101 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to any of the previously mentioned communication protocols. The exemplary communication system 100 may also comprise at least a second input 102 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first

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	communication protocol discussed above). For example and without limitation, the second baseband signal may correspond to any of the previously mentioned communication protocols. The first baseband signal and the second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of the communication system 100. For example, such modules may generate the first and second baseband signals independently (e.g., corresponding to independent respective communications). Alternatively, for example, such modules may generate the first and second baseband signals in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first and second baseband signals for a single communication). The exemplary communication system 100 may additionally comprise a spectral placement module 110 that is adapted to spectrally shift the first baseband signal (i.e., shift the frequency spectrum of the first baseband signal). In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to spectrally shift the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with the second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to implement a frequency-hopping scheme with the first baseband signal. For example, in a scenario, where there are one or more frequency bands (e.g., a second frequency space) associated with the second baseband signal, the spectral placement module 110 may be adapted to shift the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. *See, e.g.*, Rofougaran at 2:38-3:58. The exemplary communication system 100 may also comprise a second spectral placement module 120. Such a second spectral placement module 120 may, for example, share any or all characteristics

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	with the spectral placement module 110 discussed previously. The incorporation of such a second spectral placement module 120 may, for example, provide spectral shifting flexibility. For example, in such an exemplary configuration, either or both of the first and second baseband signals may be spectrally shifted to substantially distinct frequency spaces. Also for example, in such an exemplary configuration, either or both of the first and second baseband signals may be frequency hopped. Note that though the second spectral placement module 120 is illustrated separate from the first spectral placement module 110, the second spectral placement module 120 may share any or all hardware and/or software components with the spectral placement module 110. The exemplary communication system 100 may further comprise a signal combiner 130 that is adapted to generate a composite signal comprising various input signals to the signal combiner 130. For example, the composite signal may simultaneously (i.e., at an instant in time) comprise components associated with various input signals. Note that such simultaneity need not always be present. For example, at a first instant in time, the signal output from the signal combiner 130 might comprise a plurality of components associated with a plurality of respective input signals, at a second instant in time, the signal output from the signal combiner 130 might comprise a single component associated with a single respective input signal, and at a third instant in time, the signal output from the signal combiner 130 might comprise no components. In a first non-limiting exemplary scenario, the signal combiner 130 may receive a first signal that is based on the first baseband signal (e.g., associated with a first communication protocol). Also, the signal combiner 130 may receive a second signal that is based on the second baseband signal (e.g., associated with a second communication protocol). In such a scenario, the signal combiner 130 may combine the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the first baseband signal and a second signal component based on the second baseband signal. In such a scenario, for example where the frequency spectra of the first and second baseband signals do not overlap, the first and second baseband signals might not be spectrally shifted prior to combining by the signal combiner 130. In such a scenario, the spectral placement module 110 (and optionally, the second spectral placement module 120) may receive a control signal indicating whether or not to perform spectral shifting and/or to what degree spectral shifting should be implemented.

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	See, e.g., Rofougaran at 4:16-67. Various components of the exemplary communication system 100 (and other communication systems illustrated and discussed herein) may be implemented in analog and/or digital circuitry. To illustrate this, the exemplary communication system 100 is not shown with analog-to-digital converters (ADCs) or digital-to-analog converters (DACs). FIGS. 4-6, to be discussed later, show various non-limiting exemplary configurations including such converters. FIG. 2 is a diagram showing a portion of a second non-limiting exemplary communication system 200, in accordance with various aspects of the present invention. The communication system 200 may, for example and without limitation, share any or all characteristics with the communication system 100 illustrated in FIG. 1 and discussed previously. The exemplary communication system 200 may comprise at least a first input 201 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to the Bluetooth communication protocol. FIG. 2 shows an exemplary frequency spectrum 203 associated with the first baseband signal. The exemplary communication system 200 may also comprise at least a second input 202 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first communication protocol discussed above). For example and without limitation, the first baseband signal may correspond to an IEEE 802.11 communication protocol (e.g., IEEE 802.11(b) or IEEE 802.11(g)). FIG. 2 shows an exemplary frequency spectrum 204 associated with the second baseband signal. *See, e.g.*, Rofougaran at 5:64-6:31.

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	In a non-limiting exemplary configuration illustrated in FIG. 2, the signal combiner 230 receives a first signal from the spectral placement module 210 that is based on the spectrally shifted first baseband signal. Also, the signal combiner 230 receives a second signal that is based on the second baseband signal. In such a configuration, the signal combiner 230 combines the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the spectrally shifted first baseband signal and a second signal component based on the second baseband signal (e.g., not spectrally shifted). FIG. 2 shows an exemplary frequency spectrum 231 associated with the composite signal formed by the signal combiner 230. The spectrum 231 comprises a first portion 233 corresponding to the first signal component, and a second portion 232 corresponding to the second signal component. Note that the first portion 233 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 232. The exemplary communication system 200 may also comprise an upconverter 240 adapted to upconvert a signal (e.g., the composite signal from the signal combiner 230) for transmission. The upconverter 240 may, for example and without limitation, share any or all characteristics with the upconverter 140 discussed previously. The upconverter 240 may, for example, comprise a mixer 247, a local oscillator 246 and one or more filters 248. The mixer 247 may, for example, receive the composite signal from the signal combiner 230 and an RF mixing signal at frequency fRF from a local oscillator 246. The upconverter 240 may, for example, filter the upconverted signal from the mixer 247 with one or more filters 248. The output of the upconverter 240 may, for example, comprise a signal indicative of the composite signal spectrally shifted to an RF frequency. FIG. 2 shows an exemplary frequency spectrum 241 associated with the RF signal formed by the upconverter 240. The frequency spectrum 241 comprises a first portion 243 corresponding to the first signal component and a second portion 242 corresponding to the second signal component. Note that the first portion 243 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 242. Also note that the first portion 243 and

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	second portion 242 might be formed with a first mirror portion 244 and second mirror portion 245, respectively. Note that a mirror portion may either be removed or may be kept for later processing. The exemplary communication system 200 may further comprise a RF transmission stage 250 adapted to transmit an RF signal. The RF transmission stage 250 may, for example and without limitation, share any or all characteristics with the RF transmission stage 150 discussed previously. Such an RF signal may, for example, be associated with the composite signal output from the signal combiner 230 and upconverted by the upconverter 240. The RF transmission stage 250 may, for example and without limitation, comprise a power amplifier 252, antenna 254 and other components generally associated with RF signal transmission. *See, e.g.*, Rofougaran at 6:66-7:57. For example, the spectral placement module 510, optional second spectral placement module 520 and signal combiner 530 may operate in the analog domain. The first digital-to-analog converter 592 may convert the first baseband signal to the analog domain for processing by the spectral placement module 510. The second digital-to-analog converter 594 may convert the second baseband signal to the analog domain for processing by the second spectral placement module 520 or signal combiner 530. The signal combiner 530 then combines signals in the analog domain to generate an analog composite signal, which is then upconverted and transmitted by the upconverter 540 and RF transmission stage 550, respectively. *See, e.g.*, Rofougaran at 9:30-41. FIG. 7 is a diagram showing a portion of a seventh non-limiting exemplary communication system 700, in accordance with various aspects of the present invention. The exemplary communication system 700 may, for example and without limitation, share any or all characteristics with the exemplary systems 100-600 illustrated in FIGS. 1-6 and discussed previously. The exemplary communication system 700 may comprise a first mixer 744 that receives a spectrally shifted first baseband signal from the spectral placement module 710 and a first RF mixing signal (e.g., a 2.446 GHz signal generally associated with the Bluetooth communication protocol) from a

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	first local oscillator 742. The exemplary communication system 700 may also comprise a second mixer 748 that receives a second baseband signal (or a spectrally shifted second baseband signal) and a second RF mixing signal (e.g., a 2.486 GHz signal generally associated with the IEEE 802.11(g) communication protocol) from a second local oscillator 746. The exemplary communication system 700 may comprise an RF signal combiner 730 that is adapted to combine input RF signals. The RF signal combiner 730 may, for example, receive and combine the output signals from the first mixer 744 and second mixer 748 to generate an RF composite signal. The exemplary communication system 700 may also comprise a RF transmission stage 750 that receives the RF composite signal from the RF signal combiner 730 and transmit the signal. *See, e.g.*, Rofougaran at 10:18-43. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 810 comprises receiving the first baseband signal, step 810 may comprise receiving the first baseband signal in any manner generally associated with receiving a baseband signal. The first baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 810 may, for example, comprise generating the first baseband signal independently (e.g., corresponding to an independent communication). Step 810 may alternatively, for example, comprise generating the first baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first baseband signal and other baseband signals for a single communication). The exemplary method 800 may, at step 820, comprise spectrally placing (or shifting) the first baseband signal (e.g., received at step 810). Step 820 may, for example and without limitation, share any or all functional characteristics with the spectral placement modules 110-710 of the exemplary systems 100-700 illustrated in FIGS. 1-7 and discussed previously.

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	Step 820 may, for example, comprise spectrally shifting the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with a second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, step 820 may comprise implementing a frequency-hopping scheme with the first baseband signal. For example, in a scenario where there are one or more frequency bands (e.g., a second frequency space) associated with a second baseband signal, step 820 may comprise spectrally shifting the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. In another non-limiting exemplary scenario, spectrally shifting the first baseband signal may result in the production of a spectral image (e.g., frequency content mirrored about a mixing frequency utilized to spectrally shift the first baseband signal). In such a scenario, step 820 may comprise accepting or rejecting the image. In a scenario where an image is rejected, step 820 may comprise rejecting the image in any of a variety of manners. For example and without limitation, step 820 may comprise performing image reject mixing to spectrally shift the first baseband signal. Such image reject mixing generally comprises spectrally shifting a signal and rejecting an image associated with the spectrally shifted signal. Also for example, step 820 may comprise filtering out an unwanted image. The scope of various aspects of the present invention should not be limited by the utilization of image rejection or by any particular manner of performing such image rejection. The exemplary method 800 may, at step 830, comprise generating and/or receiving a second baseband signal corresponding to a second communication protocol (e.g., different from the first communication protocol). Step 830 may, for example and without limitation, share any or all functional characteristics with the second input 102 of the exemplary system 100 illustrated in FIG. 1 and discussed previously.

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	The second baseband signal may, for example, correspond to a second communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 830 comprises receiving the second baseband signal, step 830 may comprise receiving the second baseband signal in any manner generally associated with receiving a baseband signal. The second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 830 may, for example, comprise generating the second baseband signal independently (e.g., corresponding to a communication independent of a communication associated with the first baseband signal). Step 830 may alternatively, for example, comprise generating the second baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the second baseband signal and the first baseband signal for a single communication). *See*, *e.g.*, Rofougaran at 11:53-13:4. Furthermore, this claim element is obvious in light of Rofougaran itself, when combined with any of the other references as charted for this claim element in Exs. A-1–A-31, First Supplemental Ex. A-Obviousness Chart, and/or when combined with the knowledge of one of ordinary skill in the art. Motivations to combine may come from the knowledge of the person of ordinary skill themselves, or from the known problems and predictable solutions as embodied in these references. Further motivations to combine references and additional details may be found in the Cover Pleading and First Supplemental Ex. A-Obviousness Chart.
[10.9] amplifying the combined up-converted signal in a power amplifier resulting in an amplified combined up-converted signal; and	Rofougaran discloses “amplifying the combined up-converted signal in a power amplifier resulting in an amplified combined up-converted signal.” See, e.g.:

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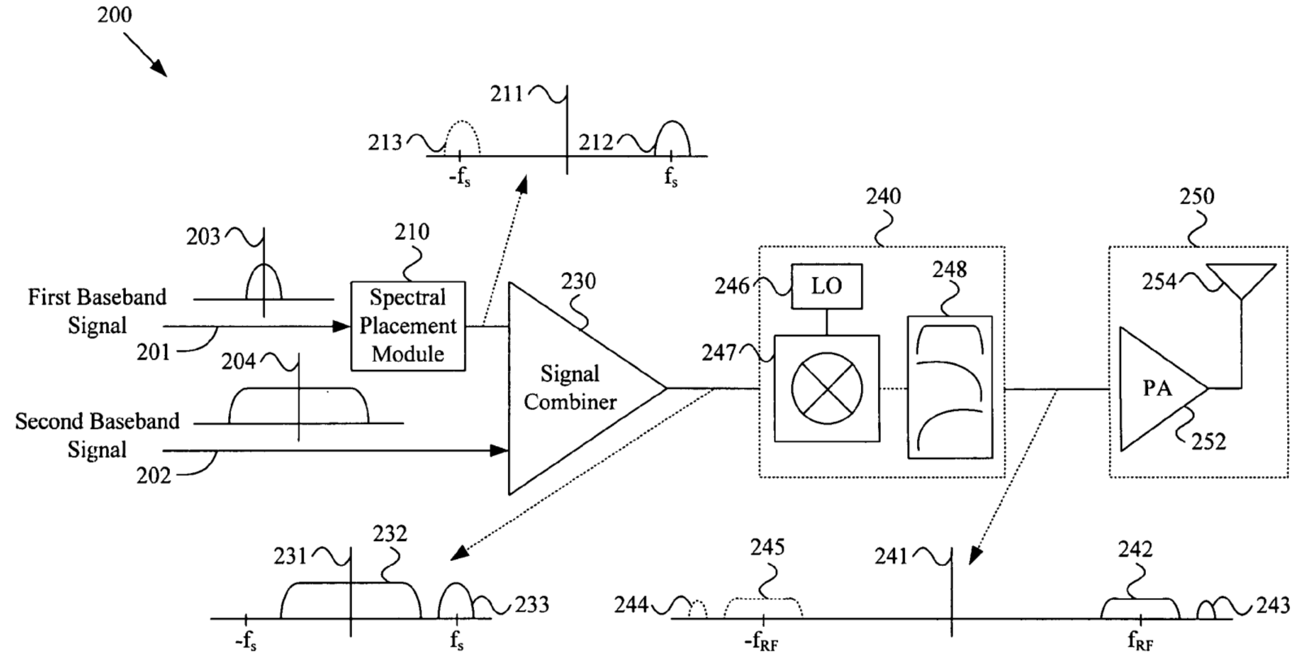
	 Figure 2 *See, e.g.*, Rofougaran at Figure 2.

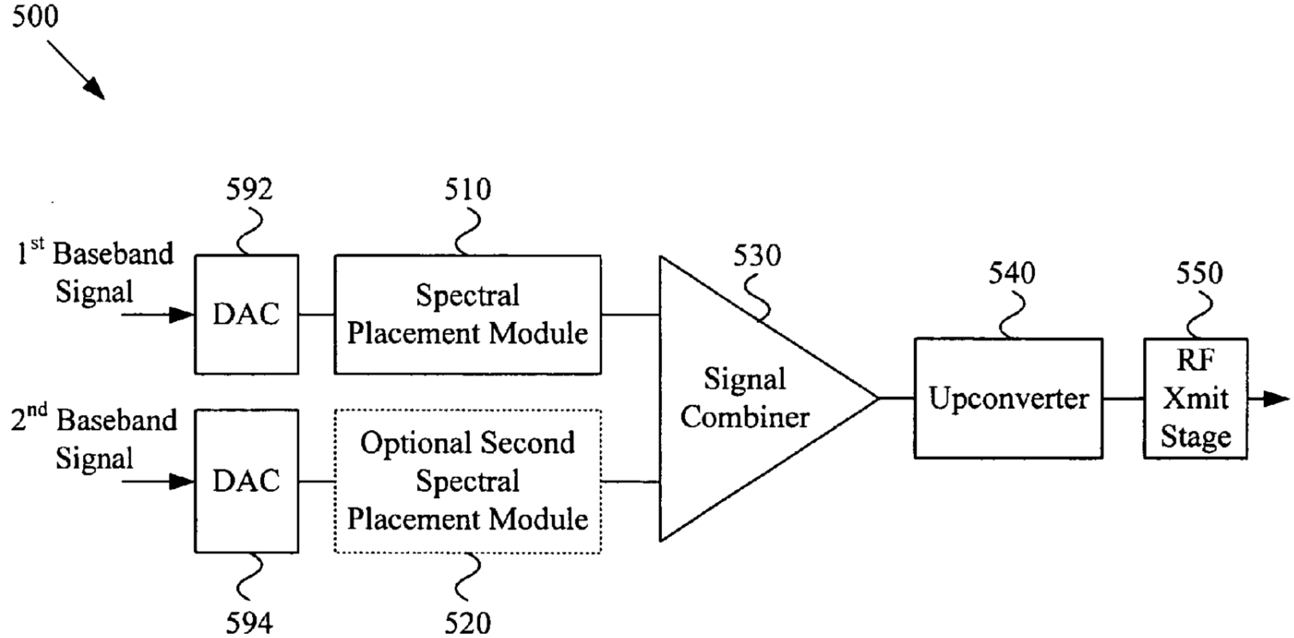
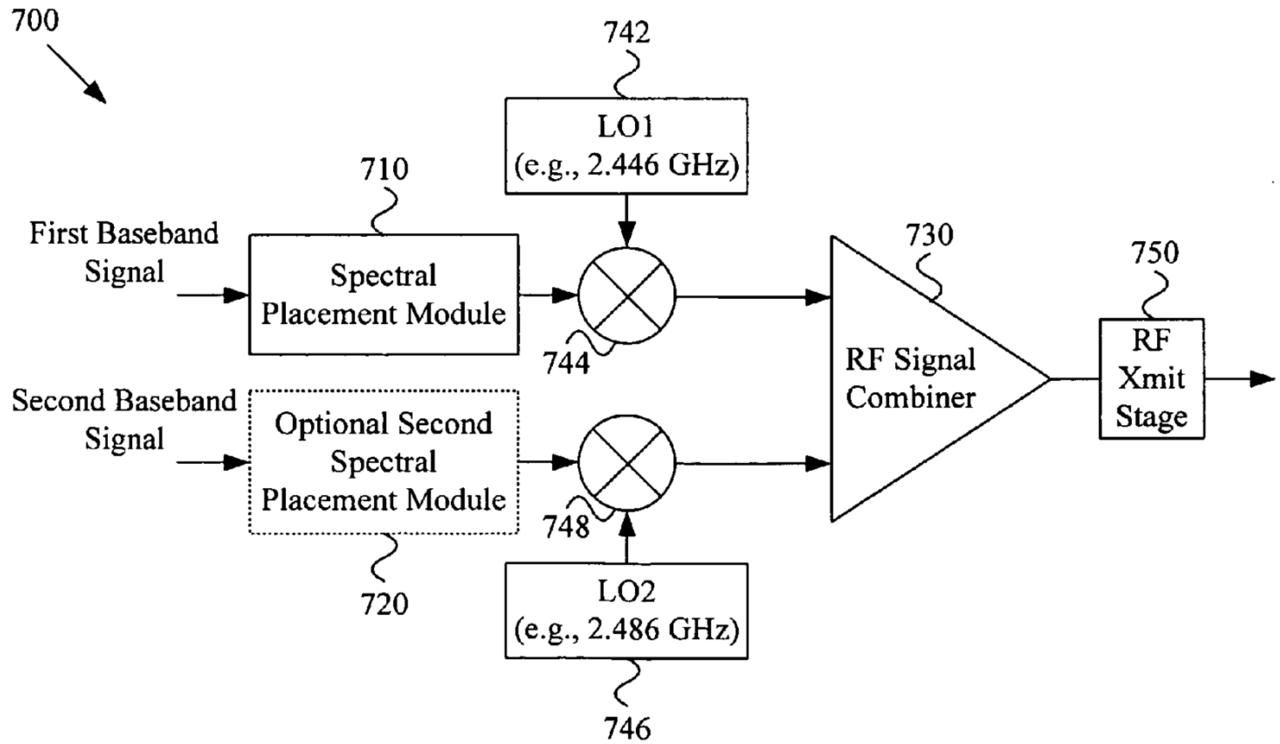
<table>
<tr><th>Claim 10 of the ’802 Patent</th><th>Prior Art Reference – Rofougaran</th></tr>
<tr><td></td><td>

Figure 5

See, e.g., Rofougaran at Figure 5.</td></tr>
</table>

Claim 10 of the '802 Patent	Prior Art Reference – Rofougaran
	 Figure 7 *See, e.g.*, Rofougaran at Figure 7. FIG. 1 is a diagram showing a portion of a first non-limiting exemplary communication system 100, in accordance with various aspects of the present invention. The communication system (or device) may comprise characteristics of any of a variety of communication systems/devices (e.g., multimode wireless communication devices). For example and without limitation, the communication system may comprise characteristics of any of a variety of mobile wireless communication devices (e.g.,

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	cellular phones, paging devices, portable email devices, etc.). Also for example, the communication system may comprise characteristics of fixed communication systems or devices (e.g., network access points, base stations, satellites, wireless routers, set top boxes, etc.). Further for example, the communication system may comprise characteristics of a variety of electronic devices with wireless communication capability (e.g., televisions, music players, cameras, remote controls, personal digital assistants, handheld computers, gaming devices, etc.). Accordingly, the scope of various aspects of the present invention should not be limited by characteristics of particular communication systems or devices. The following discussion will, at times, refer to various communication modes. A multimode communication device may, for example, be adapted to communicate in a plurality of such communication modes. For the following discussion, a communication mode may generally be considered to coincide with communication utilizing a particular communication protocol or standard. A non-limiting list of exemplary communication protocols includes various cellular communication protocols (e.g., GSM, GPRS, EDGE, CDMA, WCDMA, TDMA, PDC, etc.), various wireless networking protocols or standards, including WLAN, WMAN, WPAN and WWAN (e.g., IEEE 802.11, Bluetooth, IEEE 802.15, UWB, IEEE 802.16, IEEE 802.20, Zigbee, any WiFi protocol, etc.), various television communication standards, etc. The scope of various aspects of the present invention should not be limited by characteristics of particular communication modes or protocols, whether standard or proprietary. The exemplary communication system 100 may comprise at least a first input 101 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to any of the previously mentioned communication protocols. The exemplary communication system 100 may also comprise at least a second input 102 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first

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	communication protocol discussed above). For example and without limitation, the second baseband signal may correspond to any of the previously mentioned communication protocols. The first baseband signal and the second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of the communication system 100. For example, such modules may generate the first and second baseband signals independently (e.g., corresponding to independent respective communications). Alternatively, for example, such modules may generate the first and second baseband signals in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first and second baseband signals for a single communication). The exemplary communication system 100 may additionally comprise a spectral placement module 110 that is adapted to spectrally shift the first baseband signal (i.e., shift the frequency spectrum of the first baseband signal). In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to spectrally shift the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with the second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to implement a frequency-hopping scheme with the first baseband signal. For example, in a scenario, where there are one or more frequency bands (e.g., a second frequency space) associated with the second baseband signal, the spectral placement module 110 may be adapted to shift the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. *See, e.g.*, Rofougaran at 2:38-3:58. The exemplary communication system 100 may also comprise a second spectral placement module 120. Such a second spectral placement module 120 may, for example, share any or all characteristics

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	with the spectral placement module 110 discussed previously. The incorporation of such a second spectral placement module 120 may, for example, provide spectral shifting flexibility. For example, in such an exemplary configuration, either or both of the first and second baseband signals may be spectrally shifted to substantially distinct frequency spaces. Also for example, in such an exemplary configuration, either or both of the first and second baseband signals may be frequency hopped. Note that though the second spectral placement module 120 is illustrated separate from the first spectral placement module 110, the second spectral placement module 120 may share any or all hardware and/or software components with the spectral placement module 110. The exemplary communication system 100 may further comprise a signal combiner 130 that is adapted to generate a composite signal comprising various input signals to the signal combiner 130. For example, the composite signal may simultaneously (i.e., at an instant in time) comprise components associated with various input signals. Note that such simultaneity need not always be present. For example, at a first instant in time, the signal output from the signal combiner 130 might comprise a plurality of components associated with a plurality of respective input signals, at a second instant in time, the signal output from the signal combiner 130 might comprise a single component associated with a single respective input signal, and at a third instant in time, the signal output from the signal combiner 130 might comprise no components. In a first non-limiting exemplary scenario, the signal combiner 130 may receive a first signal that is based on the first baseband signal (e.g., associated with a first communication protocol). Also, the signal combiner 130 may receive a second signal that is based on the second baseband signal (e.g., associated with a second communication protocol). In such a scenario, the signal combiner 130 may combine the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the first baseband signal and a second signal component based on the second baseband signal. In such a scenario, for example where the frequency spectra of the first and second baseband signals do not overlap, the first and second baseband signals might not be spectrally shifted prior to combining by the signal combiner 130. In such a scenario, the spectral placement module 110 (and optionally, the second spectral placement module 120) may receive a control signal indicating whether or not to perform spectral shifting and/or to what degree spectral shifting should be implemented.

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	See, e.g., Rofougaran at 4:16-67. Various components of the exemplary communication system 100 (and other communication systems illustrated and discussed herein) may be implemented in analog and/or digital circuitry. To illustrate this, the exemplary communication system 100 is not shown with analog-to-digital converters (ADCs) or digital-to-analog converters (DACs). FIGS. 4-6, to be discussed later, show various non-limiting exemplary configurations including such converters. FIG. 2 is a diagram showing a portion of a second non-limiting exemplary communication system 200, in accordance with various aspects of the present invention. The communication system 200 may, for example and without limitation, share any or all characteristics with the communication system 100 illustrated in FIG. 1 and discussed previously. The exemplary communication system 200 may comprise at least a first input 201 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to the Bluetooth communication protocol. FIG. 2 shows an exemplary frequency spectrum 203 associated with the first baseband signal. The exemplary communication system 200 may also comprise at least a second input 202 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first communication protocol discussed above). For example and without limitation, the first baseband signal may correspond to an IEEE 802.11 communication protocol (e.g., IEEE 802.11(b) or IEEE 802.11(g)). FIG. 2 shows an exemplary frequency spectrum 204 associated with the second baseband signal. *See, e.g.*, Rofougaran at 5:64-6:31.

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	In a non-limiting exemplary configuration illustrated in FIG. 2, the signal combiner 230 receives a first signal from the spectral placement module 210 that is based on the spectrally shifted first baseband signal. Also, the signal combiner 230 receives a second signal that is based on the second baseband signal. In such a configuration, the signal combiner 230 combines the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the spectrally shifted first baseband signal and a second signal component based on the second baseband signal (e.g., not spectrally shifted). FIG. 2 shows an exemplary frequency spectrum 231 associated with the composite signal formed by the signal combiner 230. The spectrum 231 comprises a first portion 233 corresponding to the first signal component, and a second portion 232 corresponding to the second signal component. Note that the first portion 233 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 232. The exemplary communication system 200 may also comprise an upconverter 240 adapted to upconvert a signal (e.g., the composite signal from the signal combiner 230) for transmission. The upconverter 240 may, for example and without limitation, share any or all characteristics with the upconverter 140 discussed previously. The upconverter 240 may, for example, comprise a mixer 247, a local oscillator 246 and one or more filters 248. The mixer 247 may, for example, receive the composite signal from the signal combiner 230 and an RF mixing signal at frequency fRF from a local oscillator 246. The upconverter 240 may, for example, filter the upconverted signal from the mixer 247 with one or more filters 248. The output of the upconverter 240 may, for example, comprise a signal indicative of the composite signal spectrally shifted to an RF frequency. FIG. 2 shows an exemplary frequency spectrum 241 associated with the RF signal formed by the upconverter 240. The frequency spectrum 241 comprises a first portion 243 corresponding to the first signal component and a second portion 242 corresponding to the second signal component. Note that the first portion 243 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 242. Also note that the first portion 243 and

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	second portion 242 might be formed with a first mirror portion 244 and second mirror portion 245, respectively. Note that a mirror portion may either be removed or may be kept for later processing. The exemplary communication system 200 may further comprise a RF transmission stage 250 adapted to transmit an RF signal. The RF transmission stage 250 may, for example and without limitation, share any or all characteristics with the RF transmission stage 150 discussed previously. Such an RF signal may, for example, be associated with the composite signal output from the signal combiner 230 and upconverted by the upconverter 240. The RF transmission stage 250 may, for example and without limitation, comprise a power amplifier 252, antenna 254 and other components generally associated with RF signal transmission. *See, e.g.*, Rofougaran at 6:66-7:57. For example, the spectral placement module 510, optional second spectral placement module 520 and signal combiner 530 may operate in the analog domain. The first digital-to-analog converter 592 may convert the first baseband signal to the analog domain for processing by the spectral placement module 510. The second digital-to-analog converter 594 may convert the second baseband signal to the analog domain for processing by the second spectral placement module 520 or signal combiner 530. The signal combiner 530 then combines signals in the analog domain to generate an analog composite signal, which is then upconverted and transmitted by the upconverter 540 and RF transmission stage 550, respectively. *See, e.g.*, Rofougaran at 9:30-41. FIG. 7 is a diagram showing a portion of a seventh non-limiting exemplary communication system 700, in accordance with various aspects of the present invention. The exemplary communication system 700 may, for example and without limitation, share any or all characteristics with the exemplary systems 100-600 illustrated in FIGS. 1-6 and discussed previously. The exemplary communication system 700 may comprise a first mixer 744 that receives a spectrally shifted first baseband signal from the spectral placement module 710 and a first RF mixing signal (e.g., a 2.446 GHz signal generally associated with the Bluetooth communication protocol) from a

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	first local oscillator 742. The exemplary communication system 700 may also comprise a second mixer 748 that receives a second baseband signal (or a spectrally shifted second baseband signal) and a second RF mixing signal (e.g., a 2.486 GHz signal generally associated with the IEEE 802.11(g) communication protocol) from a second local oscillator 746. The exemplary communication system 700 may comprise an RF signal combiner 730 that is adapted to combine input RF signals. The RF signal combiner 730 may, for example, receive and combine the output signals from the first mixer 744 and second mixer 748 to generate an RF composite signal. The exemplary communication system 700 may also comprise a RF transmission stage 750 that receives the RF composite signal from the RF signal combiner 730 and transmit the signal. *See, e.g.*, Rofougaran at 10:18-43. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 810 comprises receiving the first baseband signal, step 810 may comprise receiving the first baseband signal in any manner generally associated with receiving a baseband signal. The first baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 810 may, for example, comprise generating the first baseband signal independently (e.g., corresponding to an independent communication). Step 810 may alternatively, for example, comprise generating the first baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first baseband signal and other baseband signals for a single communication). The exemplary method 800 may, at step 820, comprise spectrally placing (or shifting) the first baseband signal (e.g., received at step 810). Step 820 may, for example and without limitation, share any or all functional characteristics with the spectral placement modules 110-710 of the exemplary systems 100-700 illustrated in FIGS. 1-7 and discussed previously.

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	Step 820 may, for example, comprise spectrally shifting the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with a second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, step 820 may comprise implementing a frequency-hopping scheme with the first baseband signal. For example, in a scenario where there are one or more frequency bands (e.g., a second frequency space) associated with a second baseband signal, step 820 may comprise spectrally shifting the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. In another non-limiting exemplary scenario, spectrally shifting the first baseband signal may result in the production of a spectral image (e.g., frequency content mirrored about a mixing frequency utilized to spectrally shift the first baseband signal). In such a scenario, step 820 may comprise accepting or rejecting the image. In a scenario where an image is rejected, step 820 may comprise rejecting the image in any of a variety of manners. For example and without limitation, step 820 may comprise performing image reject mixing to spectrally shift the first baseband signal. Such image reject mixing generally comprises spectrally shifting a signal and rejecting an image associated with the spectrally shifted signal. Also for example, step 820 may comprise filtering out an unwanted image. The scope of various aspects of the present invention should not be limited by the utilization of image rejection or by any particular manner of performing such image rejection. The exemplary method 800 may, at step 830, comprise generating and/or receiving a second baseband signal corresponding to a second communication protocol (e.g., different from the first communication protocol). Step 830 may, for example and without limitation, share any or all functional characteristics with the second input 102 of the exemplary system 100 illustrated in FIG. 1 and discussed previously.

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	The second baseband signal may, for example, correspond to a second communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 830 comprises receiving the second baseband signal, step 830 may comprise receiving the second baseband signal in any manner generally associated with receiving a baseband signal. The second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 830 may, for example, comprise generating the second baseband signal independently (e.g., corresponding to a communication independent of a communication associated with the first baseband signal). Step 830 may alternatively, for example, comprise generating the second baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the second baseband signal and the first baseband signal for a single communication). *See, e.g.*, Rofougaran at 11:53-13:4. Furthermore, this claim element is obvious in light of Rofougaran itself, when combined with any of the other references as charted for this claim element in Exs. A-1–A-31, First Supplemental Ex. A-Obviousness Chart, and/or when combined with the knowledge of one of ordinary skill in the art. Motivations to combine may come from the knowledge of the person of ordinary skill themselves, or from the known problems and predictable solutions as embodied in these references. Further motivations to combine references and additional details may be found in the Cover Pleading and First Supplemental Ex. A-Obviousness Chart.
[10.10] transmitting the amplified combined up-converted signal on a first antenna,	Rofougaran discloses “transmitting the amplified combined up-converted signal on a first antenna.” See, e.g.:

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	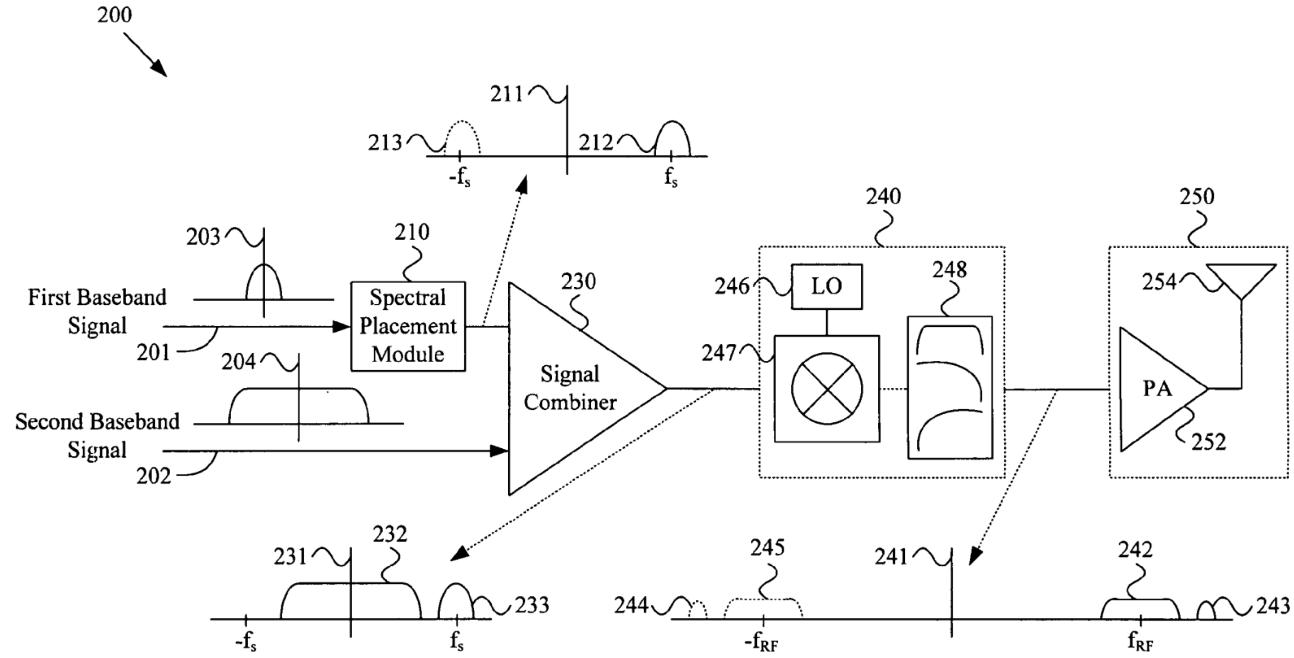 Figure 2 *See, e.g.*, Rofougaran at Figure 2.

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	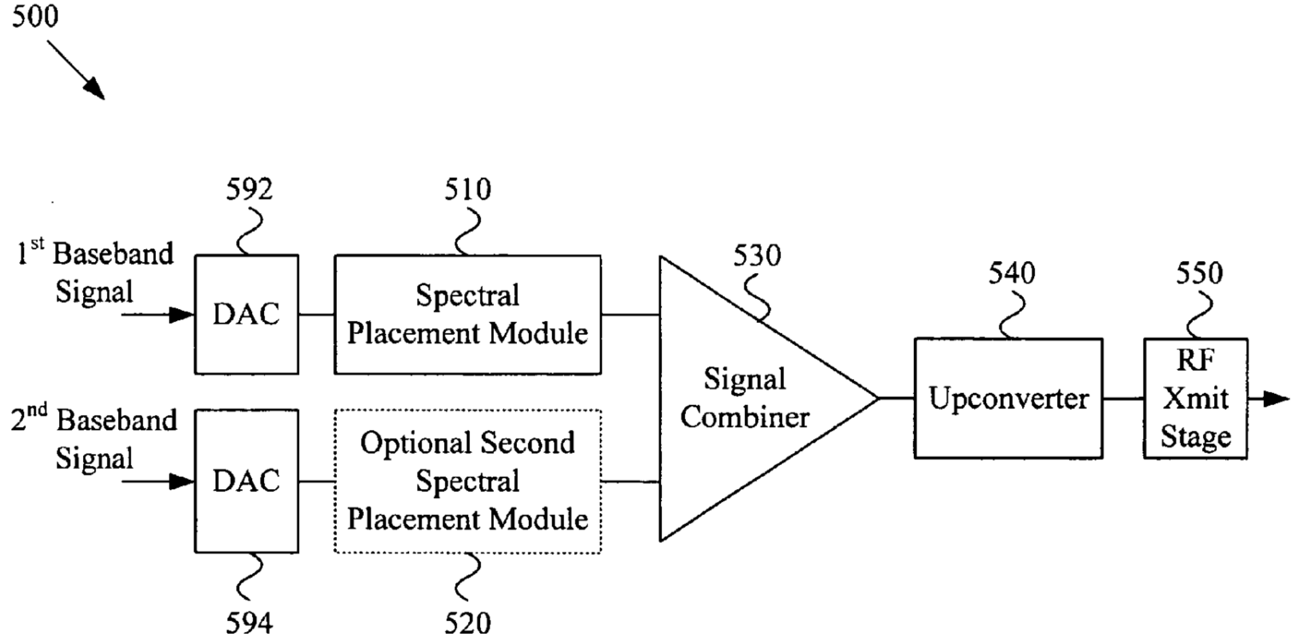 Figure 5 *See, e.g.*, Rofougaran at Figure 5.

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	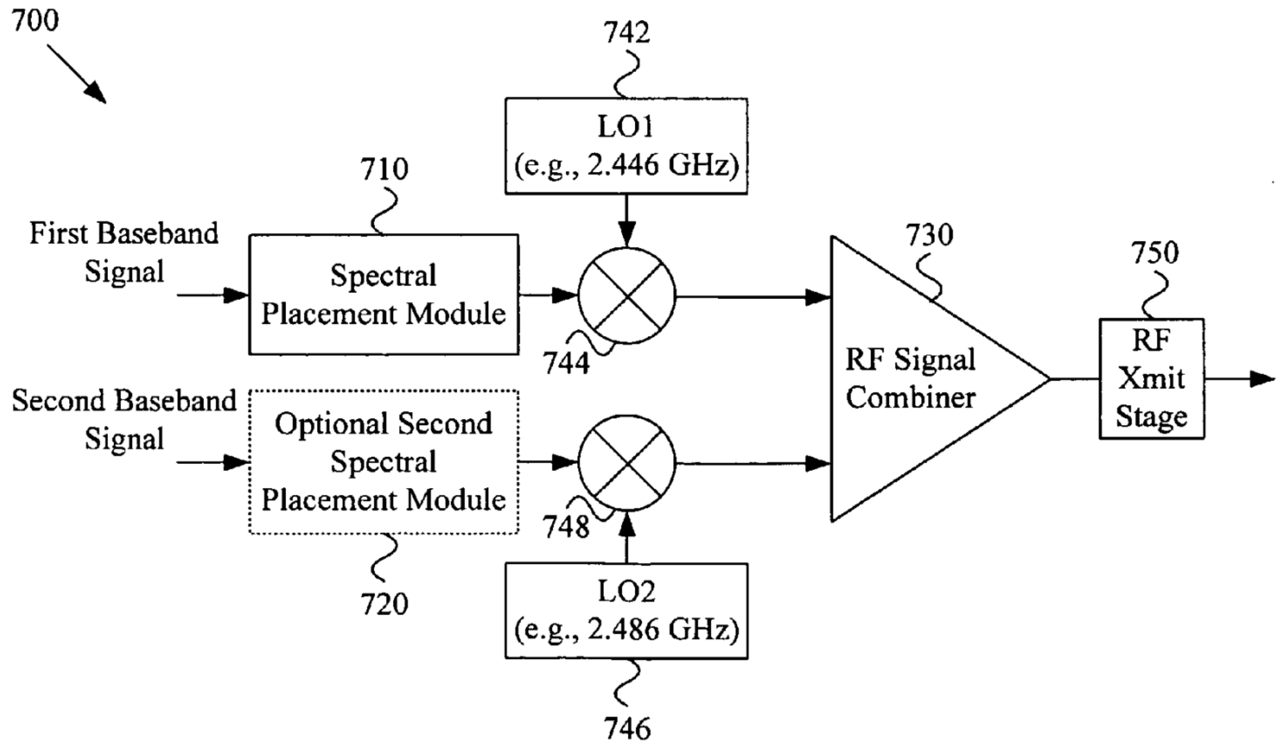 Figure 7 *See, e.g.*, Rofougaran at Figure 7. FIG. 1 is a diagram showing a portion of a first non-limiting exemplary communication system 100, in accordance with various aspects of the present invention. The communication system (or device) may comprise characteristics of any of a variety of communication systems/devices (e.g., multimode wireless communication devices). For example and without limitation, the communication system may comprise characteristics of any of a variety of mobile wireless communication devices (e.g.,

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	cellular phones, paging devices, portable email devices, etc.). Also for example, the communication system may comprise characteristics of fixed communication systems or devices (e.g., network access points, base stations, satellites, wireless routers, set top boxes, etc.). Further for example, the communication system may comprise characteristics of a variety of electronic devices with wireless communication capability (e.g., televisions, music players, cameras, remote controls, personal digital assistants, handheld computers, gaming devices, etc.). Accordingly, the scope of various aspects of the present invention should not be limited by characteristics of particular communication systems or devices. The following discussion will, at times, refer to various communication modes. A multimode communication device may, for example, be adapted to communicate in a plurality of such communication modes. For the following discussion, a communication mode may generally be considered to coincide with communication utilizing a particular communication protocol or standard. A non-limiting list of exemplary communication protocols includes various cellular communication protocols (e.g., GSM, GPRS, EDGE, CDMA, WCDMA, TDMA, PDC, etc.), various wireless networking protocols or standards, including WLAN, WMAN, WPAN and WWAN (e.g., IEEE 802.11, Bluetooth, IEEE 802.15, UWB, IEEE 802.16, IEEE 802.20, Zigbee, any WiFi protocol, etc.), various television communication standards, etc. The scope of various aspects of the present invention should not be limited by characteristics of particular communication modes or protocols, whether standard or proprietary. The exemplary communication system 100 may comprise at least a first input 101 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to any of the previously mentioned communication protocols. The exemplary communication system 100 may also comprise at least a second input 102 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first

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	communication protocol discussed above). For example and without limitation, the second baseband signal may correspond to any of the previously mentioned communication protocols. The first baseband signal and the second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of the communication system 100. For example, such modules may generate the first and second baseband signals independently (e.g., corresponding to independent respective communications). Alternatively, for example, such modules may generate the first and second baseband signals in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first and second baseband signals for a single communication). The exemplary communication system 100 may additionally comprise a spectral placement module 110 that is adapted to spectrally shift the first baseband signal (i.e., shift the frequency spectrum of the first baseband signal). In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to spectrally shift the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with the second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to implement a frequency-hopping scheme with the first baseband signal. For example, in a scenario, where there are one or more frequency bands (e.g., a second frequency space) associated with the second baseband signal, the spectral placement module 110 may be adapted to shift the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. *See, e.g.*, Rofougaran at 2:38-3:58. The exemplary communication system 100 may also comprise a second spectral placement module 120. Such a second spectral placement module 120 may, for example, share any or all characteristics

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	with the spectral placement module 110 discussed previously. The incorporation of such a second spectral placement module 120 may, for example, provide spectral shifting flexibility. For example, in such an exemplary configuration, either or both of the first and second baseband signals may be spectrally shifted to substantially distinct frequency spaces. Also for example, in such an exemplary configuration, either or both of the first and second baseband signals may be frequency hopped. Note that though the second spectral placement module 120 is illustrated separate from the first spectral placement module 110, the second spectral placement module 120 may share any or all hardware and/or software components with the spectral placement module 110. The exemplary communication system 100 may further comprise a signal combiner 130 that is adapted to generate a composite signal comprising various input signals to the signal combiner 130. For example, the composite signal may simultaneously (i.e., at an instant in time) comprise components associated with various input signals. Note that such simultaneity need not always be present. For example, at a first instant in time, the signal output from the signal combiner 130 might comprise a plurality of components associated with a plurality of respective input signals, at a second instant in time, the signal output from the signal combiner 130 might comprise a single component associated with a single respective input signal, and at a third instant in time, the signal output from the signal combiner 130 might comprise no components. In a first non-limiting exemplary scenario, the signal combiner 130 may receive a first signal that is based on the first baseband signal (e.g., associated with a first communication protocol). Also, the signal combiner 130 may receive a second signal that is based on the second baseband signal (e.g., associated with a second communication protocol). In such a scenario, the signal combiner 130 may combine the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the first baseband signal and a second signal component based on the second baseband signal. In such a scenario, for example where the frequency spectra of the first and second baseband signals do not overlap, the first and second baseband signals might not be spectrally shifted prior to combining by the signal combiner 130. In such a scenario, the spectral placement module 110 (and optionally, the second spectral placement module 120) may receive a control signal indicating whether or not to perform spectral shifting and/or to what degree spectral shifting should be implemented.

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	See, e.g., Rofougaran at 4:16-67. Various components of the exemplary communication system 100 (and other communication systems illustrated and discussed herein) may be implemented in analog and/or digital circuitry. To illustrate this, the exemplary communication system 100 is not shown with analog-to-digital converters (ADCs) or digital-to-analog converters (DACs). FIGS. 4-6, to be discussed later, show various non-limiting exemplary configurations including such converters. FIG. 2 is a diagram showing a portion of a second non-limiting exemplary communication system 200, in accordance with various aspects of the present invention. The communication system 200 may, for example and without limitation, share any or all characteristics with the communication system 100 illustrated in FIG. 1 and discussed previously. The exemplary communication system 200 may comprise at least a first input 201 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to the Bluetooth communication protocol. FIG. 2 shows an exemplary frequency spectrum 203 associated with the first baseband signal. The exemplary communication system 200 may also comprise at least a second input 202 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first communication protocol discussed above). For example and without limitation, the first baseband signal may correspond to an IEEE 802.11 communication protocol (e.g., IEEE 802.11(b) or IEEE 802.11(g)). FIG. 2 shows an exemplary frequency spectrum 204 associated with the second baseband signal. *See, e.g.*, Rofougaran at 5:64-6:31.

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	In a non-limiting exemplary configuration illustrated in FIG. 2, the signal combiner 230 receives a first signal from the spectral placement module 210 that is based on the spectrally shifted first baseband signal. Also, the signal combiner 230 receives a second signal that is based on the second baseband signal. In such a configuration, the signal combiner 230 combines the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the spectrally shifted first baseband signal and a second signal component based on the second baseband signal (e.g., not spectrally shifted). FIG. 2 shows an exemplary frequency spectrum 231 associated with the composite signal formed by the signal combiner 230. The spectrum 231 comprises a first portion 233 corresponding to the first signal component, and a second portion 232 corresponding to the second signal component. Note that the first portion 233 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 232. The exemplary communication system 200 may also comprise an upconverter 240 adapted to upconvert a signal (e.g., the composite signal from the signal combiner 230) for transmission. The upconverter 240 may, for example and without limitation, share any or all characteristics with the upconverter 140 discussed previously. The upconverter 240 may, for example, comprise a mixer 247, a local oscillator 246 and one or more filters 248. The mixer 247 may, for example, receive the composite signal from the signal combiner 230 and an RF mixing signal at frequency fRF from a local oscillator 246. The upconverter 240 may, for example, filter the upconverted signal from the mixer 247 with one or more filters 248. The output of the upconverter 240 may, for example, comprise a signal indicative of the composite signal spectrally shifted to an RF frequency. FIG. 2 shows an exemplary frequency spectrum 241 associated with the RF signal formed by the upconverter 240. The frequency spectrum 241 comprises a first portion 243 corresponding to the first signal component and a second portion 242 corresponding to the second signal component. Note that the first portion 243 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 242. Also note that the first portion 243 and

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	second portion 242 might be formed with a first mirror portion 244 and second mirror portion 245, respectively. Note that a mirror portion may either be removed or may be kept for later processing. The exemplary communication system 200 may further comprise a RF transmission stage 250 adapted to transmit an RF signal. The RF transmission stage 250 may, for example and without limitation, share any or all characteristics with the RF transmission stage 150 discussed previously. Such an RF signal may, for example, be associated with the composite signal output from the signal combiner 230 and upconverted by the upconverter 240. The RF transmission stage 250 may, for example and without limitation, comprise a power amplifier 252, antenna 254 and other components generally associated with RF signal transmission. *See, e.g.*, Rofougaran at 6:66-7:57. For example, the spectral placement module 510, optional second spectral placement module 520 and signal combiner 530 may operate in the analog domain. The first digital-to-analog converter 592 may convert the first baseband signal to the analog domain for processing by the spectral placement module 510. The second digital-to-analog converter 594 may convert the second baseband signal to the analog domain for processing by the second spectral placement module 520 or signal combiner 530. The signal combiner 530 then combines signals in the analog domain to generate an analog composite signal, which is then upconverted and transmitted by the upconverter 540 and RF transmission stage 550, respectively. *See, e.g.*, Rofougaran at 9:30-41. FIG. 7 is a diagram showing a portion of a seventh non-limiting exemplary communication system 700, in accordance with various aspects of the present invention. The exemplary communication system 700 may, for example and without limitation, share any or all characteristics with the exemplary systems 100-600 illustrated in FIGS. 1-6 and discussed previously. The exemplary communication system 700 may comprise a first mixer 744 that receives a spectrally shifted first baseband signal from the spectral placement module 710 and a first RF mixing signal (e.g., a 2.446 GHz signal generally associated with the Bluetooth communication protocol) from a

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	first local oscillator 742. The exemplary communication system 700 may also comprise a second mixer 748 that receives a second baseband signal (or a spectrally shifted second baseband signal) and a second RF mixing signal (e.g., a 2.486 GHz signal generally associated with the IEEE 802.11(g) communication protocol) from a second local oscillator 746. The exemplary communication system 700 may comprise an RF signal combiner 730 that is adapted to combine input RF signals. The RF signal combiner 730 may, for example, receive and combine the output signals from the first mixer 744 and second mixer 748 to generate an RF composite signal. The exemplary communication system 700 may also comprise a RF transmission stage 750 that receives the RF composite signal from the RF signal combiner 730 and transmit the signal. *See*, *e.g.*, Rofougaran at 10:18-43. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 810 comprises receiving the first baseband signal, step 810 may comprise receiving the first baseband signal in any manner generally associated with receiving a baseband signal. The first baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 810 may, for example, comprise generating the first baseband signal independently (e.g., corresponding to an independent communication). Step 810 may alternatively, for example, comprise generating the first baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first baseband signal and other baseband signals for a single communication). The exemplary method 800 may, at step 820, comprise spectrally placing (or shifting) the first baseband signal (e.g., received at step 810). Step 820 may, for example and without limitation, share any or all functional characteristics with the spectral placement modules 110-710 of the exemplary systems 100-700 illustrated in FIGS. 1-7 and discussed previously.

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	Step 820 may, for example, comprise spectrally shifting the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with a second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, step 820 may comprise implementing a frequency-hopping scheme with the first baseband signal. For example, in a scenario where there are one or more frequency bands (e.g., a second frequency space) associated with a second baseband signal, step 820 may comprise spectrally shifting the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. In another non-limiting exemplary scenario, spectrally shifting the first baseband signal may result in the production of a spectral image (e.g., frequency content mirrored about a mixing frequency utilized to spectrally shift the first baseband signal). In such a scenario, step 820 may comprise accepting or rejecting the image. In a scenario where an image is rejected, step 820 may comprise rejecting the image in any of a variety of manners. For example and without limitation, step 820 may comprise performing image reject mixing to spectrally shift the first baseband signal. Such image reject mixing generally comprises spectrally shifting a signal and rejecting an image associated with the spectrally shifted signal. Also for example, step 820 may comprise filtering out an unwanted image. The scope of various aspects of the present invention should not be limited by the utilization of image rejection or by any particular manner of performing such image rejection. The exemplary method 800 may, at step 830, comprise generating and/or receiving a second baseband signal corresponding to a second communication protocol (e.g., different from the first communication protocol). Step 830 may, for example and without limitation, share any or all functional characteristics with the second input 102 of the exemplary system 100 illustrated in FIG. 1 and discussed previously.

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	The second baseband signal may, for example, correspond to a second communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 830 comprises receiving the second baseband signal, step 830 may comprise receiving the second baseband signal in any manner generally associated with receiving a baseband signal. The second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 830 may, for example, comprise generating the second baseband signal independently (e.g., corresponding to a communication independent of a communication associated with the first baseband signal). Step 830 may alternatively, for example, comprise generating the second baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the second baseband signal and the first baseband signal for a single communication). *See*, *e.g.*, Rofougaran at 11:53-13:4. Furthermore, this claim element is obvious in light of Rofougaran itself, when combined with any of the other references as charted for this claim element in Exs. A-1–A-31, First Supplemental Ex. A-Obviousness Chart, and/or when combined with the knowledge of one of ordinary skill in the art. Motivations to combine may come from the knowledge of the person of ordinary skill themselves, or from the known problems and predictable solutions as embodied in these references. Further motivations to combine references and additional details may be found in the Cover Pleading and First Supplemental Ex. A-Obviousness Chart.
[10.11] wherein the bandwidth of said power amplifier is greater than the difference between a lowest frequency in the first up-converted frequency range and a highest frequency in the	Rofougaran discloses "wherein the bandwidth of said power amplifier is greater than the difference between a lowest frequency in the first up-converted frequency range and a highest frequency in the second up-converted frequency range." See, e.g.:

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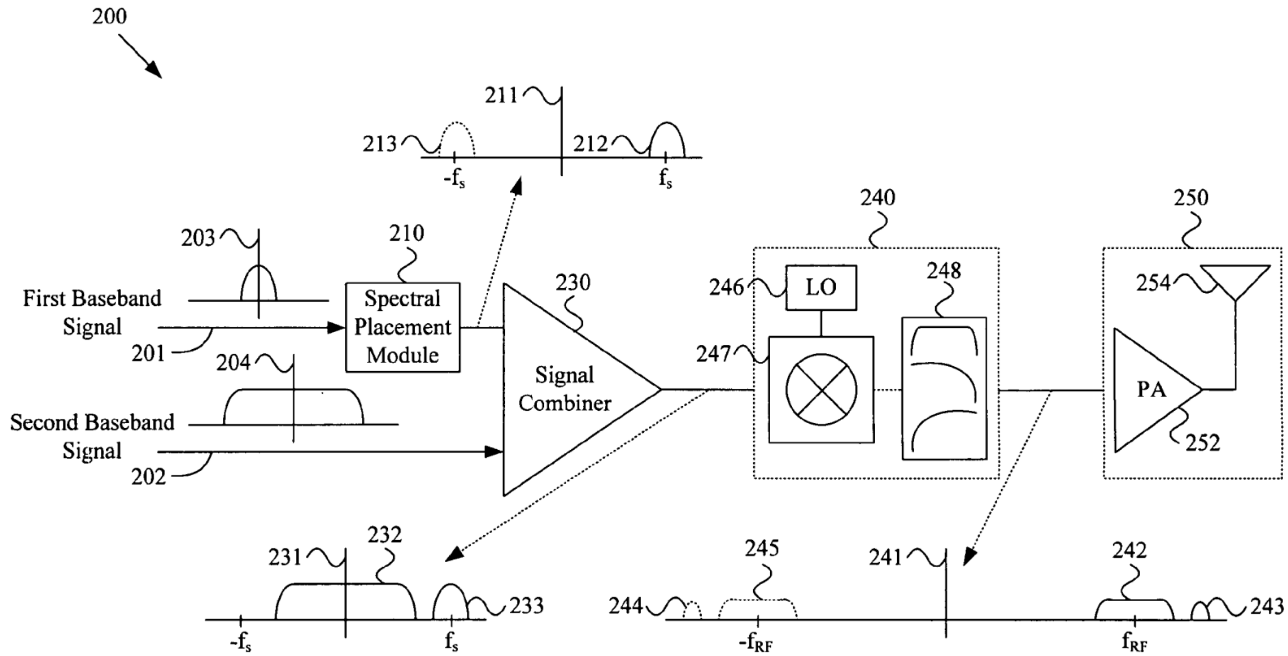
second up-converted frequency range.	 Figure 2 *See, e.g.*, Rofougaran at Figure 2.

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	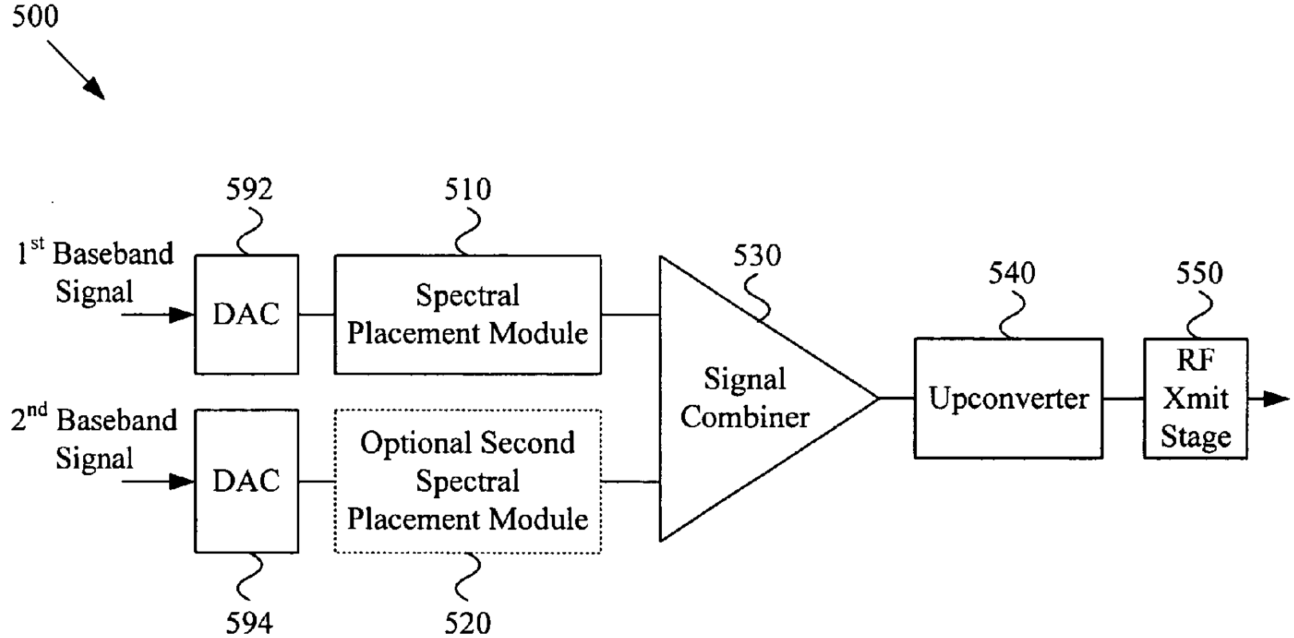 Figure 5 *See, e.g.*, Rofougaran at Figure 5.

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	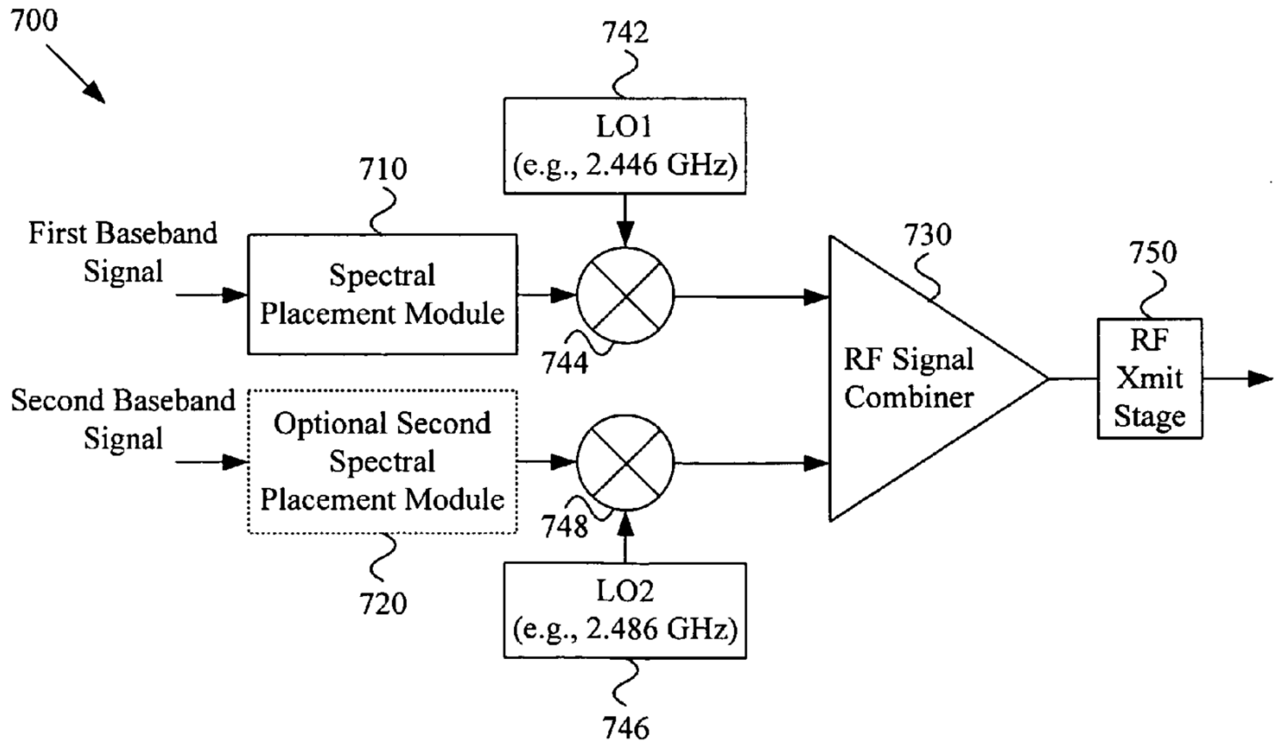 Figure 7 *See, e.g.*, Rofougaran at Figure 7. FIG. 1 is a diagram showing a portion of a first non-limiting exemplary communication system 100, in accordance with various aspects of the present invention. The communication system (or device) may comprise characteristics of any of a variety of communication systems/devices (e.g., multimode wireless communication devices). For example and without limitation, the communication system may comprise characteristics of any of a variety of mobile wireless communication devices (e.g.,

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	cellular phones, paging devices, portable email devices, etc.). Also for example, the communication system may comprise characteristics of fixed communication systems or devices (e.g., network access points, base stations, satellites, wireless routers, set top boxes, etc.). Further for example, the communication system may comprise characteristics of a variety of electronic devices with wireless communication capability (e.g., televisions, music players, cameras, remote controls, personal digital assistants, handheld computers, gaming devices, etc.). Accordingly, the scope of various aspects of the present invention should not be limited by characteristics of particular communication systems or devices. The following discussion will, at times, refer to various communication modes. A multimode communication device may, for example, be adapted to communicate in a plurality of such communication modes. For the following discussion, a communication mode may generally be considered to coincide with communication utilizing a particular communication protocol or standard. A non-limiting list of exemplary communication protocols includes various cellular communication protocols (e.g., GSM, GPRS, EDGE, CDMA, WCDMA, TDMA, PDC, etc.), various wireless networking protocols or standards, including WLAN, WMAN, WPAN and WWAN (e.g., IEEE 802.11, Bluetooth, IEEE 802.15, UWB, IEEE 802.16, IEEE 802.20, Zigbee, any WiFi protocol, etc.), various television communication standards, etc. The scope of various aspects of the present invention should not be limited by characteristics of particular communication modes or protocols, whether standard or proprietary. The exemplary communication system 100 may comprise at least a first input 101 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to any of the previously mentioned communication protocols. The exemplary communication system 100 may also comprise at least a second input 102 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first

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	communication protocol discussed above). For example and without limitation, the second baseband signal may correspond to any of the previously mentioned communication protocols. The first baseband signal and the second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of the communication system 100. For example, such modules may generate the first and second baseband signals independently (e.g., corresponding to independent respective communications). Alternatively, for example, such modules may generate the first and second baseband signals in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first and second baseband signals for a single communication). The exemplary communication system 100 may additionally comprise a spectral placement module 110 that is adapted to spectrally shift the first baseband signal (i.e., shift the frequency spectrum of the first baseband signal). In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to spectrally shift the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with the second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to implement a frequency-hopping scheme with the first baseband signal. For example, in a scenario, where there are one or more frequency bands (e.g., a second frequency space) associated with the second baseband signal, the spectral placement module 110 may be adapted to shift the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. *See, e.g.*, Rofougaran at 2:38-3:58. The exemplary communication system 100 may also comprise a second spectral placement module 120. Such a second spectral placement module 120 may, for example, share any or all characteristics

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	with the spectral placement module 110 discussed previously. The incorporation of such a second spectral placement module 120 may, for example, provide spectral shifting flexibility. For example, in such an exemplary configuration, either or both of the first and second baseband signals may be spectrally shifted to substantially distinct frequency spaces. Also for example, in such an exemplary configuration, either or both of the first and second baseband signals may be frequency hopped. Note that though the second spectral placement module 120 is illustrated separate from the first spectral placement module 110, the second spectral placement module 120 may share any or all hardware and/or software components with the spectral placement module 110. The exemplary communication system 100 may further comprise a signal combiner 130 that is adapted to generate a composite signal comprising various input signals to the signal combiner 130. For example, the composite signal may simultaneously (i.e., at an instant in time) comprise components associated with various input signals. Note that such simultaneity need not always be present. For example, at a first instant in time, the signal output from the signal combiner 130 might comprise a plurality of components associated with a plurality of respective input signals, at a second instant in time, the signal output from the signal combiner 130 might comprise a single component associated with a single respective input signal, and at a third instant in time, the signal output from the signal combiner 130 might comprise no components. In a first non-limiting exemplary scenario, the signal combiner 130 may receive a first signal that is based on the first baseband signal (e.g., associated with a first communication protocol). Also, the signal combiner 130 may receive a second signal that is based on the second baseband signal (e.g., associated with a second communication protocol). In such a scenario, the signal combiner 130 may combine the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the first baseband signal and a second signal component based on the second baseband signal. In such a scenario, for example where the frequency spectra of the first and second baseband signals do not overlap, the first and second baseband signals might not be spectrally shifted prior to combining by the signal combiner 130. In such a scenario, the spectral placement module 110 (and optionally, the second spectral placement module 120) may receive a control signal indicating whether or not to perform spectral shifting and/or to what degree spectral shifting should be implemented.

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	See, e.g., Rofougaran at 4:16-67. Various components of the exemplary communication system 100 (and other communication systems illustrated and discussed herein) may be implemented in analog and/or digital circuitry. To illustrate this, the exemplary communication system 100 is not shown with analog-to-digital converters (ADCs) or digital-to-analog converters (DACs). FIGS. 4-6, to be discussed later, show various non-limiting exemplary configurations including such converters. FIG. 2 is a diagram showing a portion of a second non-limiting exemplary communication system 200, in accordance with various aspects of the present invention. The communication system 200 may, for example and without limitation, share any or all characteristics with the communication system 100 illustrated in FIG. 1 and discussed previously. The exemplary communication system 200 may comprise at least a first input 201 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to the Bluetooth communication protocol. FIG. 2 shows an exemplary frequency spectrum 203 associated with the first baseband signal. The exemplary communication system 200 may also comprise at least a second input 202 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first communication protocol discussed above). For example and without limitation, the first baseband signal may correspond to an IEEE 802.11 communication protocol (e.g., IEEE 802.11(b) or IEEE 802.11(g)). FIG. 2 shows an exemplary frequency spectrum 204 associated with the second baseband signal. *See, e.g.*, Rofougaran at 5:64-6:31.

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	In a non-limiting exemplary configuration illustrated in FIG. 2, the signal combiner 230 receives a first signal from the spectral placement module 210 that is based on the spectrally shifted first baseband signal. Also, the signal combiner 230 receives a second signal that is based on the second baseband signal. In such a configuration, the signal combiner 230 combines the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the spectrally shifted first baseband signal and a second signal component based on the second baseband signal (e.g., not spectrally shifted). FIG. 2 shows an exemplary frequency spectrum 231 associated with the composite signal formed by the signal combiner 230. The spectrum 231 comprises a first portion 233 corresponding to the first signal component, and a second portion 232 corresponding to the second signal component. Note that the first portion 233 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 232. The exemplary communication system 200 may also comprise an upconverter 240 adapted to upconvert a signal (e.g., the composite signal from the signal combiner 230) for transmission. The upconverter 240 may, for example and without limitation, share any or all characteristics with the upconverter 140 discussed previously. The upconverter 240 may, for example, comprise a mixer 247, a local oscillator 246 and one or more filters 248. The mixer 247 may, for example, receive the composite signal from the signal combiner 230 and an RF mixing signal at frequency fRF from a local oscillator 246. The upconverter 240 may, for example, filter the upconverted signal from the mixer 247 with one or more filters 248. The output of the upconverter 240 may, for example, comprise a signal indicative of the composite signal spectrally shifted to an RF frequency. FIG. 2 shows an exemplary frequency spectrum 241 associated with the RF signal formed by the upconverter 240. The frequency spectrum 241 comprises a first portion 243 corresponding to the first signal component and a second portion 242 corresponding to the second signal component. Note that the first portion 243 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 242. Also note that the first portion 243 and

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	second portion 242 might be formed with a first mirror portion 244 and second mirror portion 245, respectively. Note that a mirror portion may either be removed or may be kept for later processing. The exemplary communication system 200 may further comprise a RF transmission stage 250 adapted to transmit an RF signal. The RF transmission stage 250 may, for example and without limitation, share any or all characteristics with the RF transmission stage 150 discussed previously. Such an RF signal may, for example, be associated with the composite signal output from the signal combiner 230 and upconverted by the upconverter 240. The RF transmission stage 250 may, for example and without limitation, comprise a power amplifier 252, antenna 254 and other components generally associated with RF signal transmission. *See, e.g.*, Rofougaran at 6:66-7:57. For example, the spectral placement module 510, optional second spectral placement module 520 and signal combiner 530 may operate in the analog domain. The first digital-to-analog converter 592 may convert the first baseband signal to the analog domain for processing by the spectral placement module 510. The second digital-to-analog converter 594 may convert the second baseband signal to the analog domain for processing by the second spectral placement module 520 or signal combiner 530. The signal combiner 530 then combines signals in the analog domain to generate an analog composite signal, which is then upconverted and transmitted by the upconverter 540 and RF transmission stage 550, respectively. *See, e.g.*, Rofougaran at 9:30-41. FIG. 7 is a diagram showing a portion of a seventh non-limiting exemplary communication system 700, in accordance with various aspects of the present invention. The exemplary communication system 700 may, for example and without limitation, share any or all characteristics with the exemplary systems 100-600 illustrated in FIGS. 1-6 and discussed previously. The exemplary communication system 700 may comprise a first mixer 744 that receives a spectrally shifted first baseband signal from the spectral placement module 710 and a first RF mixing signal (e.g., a 2.446 GHz signal generally associated with the Bluetooth communication protocol) from a

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	first local oscillator 742. The exemplary communication system 700 may also comprise a second mixer 748 that receives a second baseband signal (or a spectrally shifted second baseband signal) and a second RF mixing signal (e.g., a 2.486 GHz signal generally associated with the IEEE 802.11(g) communication protocol) from a second local oscillator 746. The exemplary communication system 700 may comprise an RF signal combiner 730 that is adapted to combine input RF signals. The RF signal combiner 730 may, for example, receive and combine the output signals from the first mixer 744 and second mixer 748 to generate an RF composite signal. The exemplary communication system 700 may also comprise a RF transmission stage 750 that receives the RF composite signal from the RF signal combiner 730 and transmit the signal. *See, e.g.*, Rofougaran at 10:18-43. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 810 comprises receiving the first baseband signal, step 810 may comprise receiving the first baseband signal in any manner generally associated with receiving a baseband signal. The first baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 810 may, for example, comprise generating the first baseband signal independently (e.g., corresponding to an independent communication). Step 810 may alternatively, for example, comprise generating the first baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first baseband signal and other baseband signals for a single communication). The exemplary method 800 may, at step 820, comprise spectrally placing (or shifting) the first baseband signal (e.g., received at step 810). Step 820 may, for example and without limitation, share any or all functional characteristics with the spectral placement modules 110-710 of the exemplary systems 100-700 illustrated in FIGS. 1-7 and discussed previously.

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	Step 820 may, for example, comprise spectrally shifting the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with a second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, step 820 may comprise implementing a frequency-hopping scheme with the first baseband signal. For example, in a scenario where there are one or more frequency bands (e.g., a second frequency space) associated with a second baseband signal, step 820 may comprise spectrally shifting the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. In another non-limiting exemplary scenario, spectrally shifting the first baseband signal may result in the production of a spectral image (e.g., frequency content mirrored about a mixing frequency utilized to spectrally shift the first baseband signal). In such a scenario, step 820 may comprise accepting or rejecting the image. In a scenario where an image is rejected, step 820 may comprise rejecting the image in any of a variety of manners. For example and without limitation, step 820 may comprise performing image reject mixing to spectrally shift the first baseband signal. Such image reject mixing generally comprises spectrally shifting a signal and rejecting an image associated with the spectrally shifted signal. Also for example, step 820 may comprise filtering out an unwanted image. The scope of various aspects of the present invention should not be limited by the utilization of image rejection or by any particular manner of performing such image rejection. The exemplary method 800 may, at step 830, comprise generating and/or receiving a second baseband signal corresponding to a second communication protocol (e.g., different from the first communication protocol). Step 830 may, for example and without limitation, share any or all functional characteristics with the second input 102 of the exemplary system 100 illustrated in FIG. 1 and discussed previously.

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	The second baseband signal may, for example, correspond to a second communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 830 comprises receiving the second baseband signal, step 830 may comprise receiving the second baseband signal in any manner generally associated with receiving a baseband signal. The second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 830 may, for example, comprise generating the second baseband signal independently (e.g., corresponding to a communication independent of a communication associated with the first baseband signal). Step 830 may alternatively, for example, comprise generating the second baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the second baseband signal and the first baseband signal for a single communication). *See*, *e.g.*, Rofougaran at 11:53-13:4. Furthermore, this claim element is obvious in light of Rofougaran itself, when combined with any of the other references as charted for this claim element in Exs. A-1–A-31, First Supplemental Ex. A-Obviousness Chart, and/or when combined with the knowledge of one of ordinary skill in the art. Motivations to combine may come from the knowledge of the person of ordinary skill themselves, or from the known problems and predictable solutions as embodied in these references. Further motivations to combine references and additional details may be found in the Cover Pleading and First Supplemental Ex. A-Obviousness Chart.

Claim 13 of the '802 Patent	Prior Art Reference – Rofougaran
[13.1] The method of claim 10	Rofougaran discloses all the elements of claim 10 for all the reasons provided above.
[13.2] wherein the first digital signal is encoded using a first wireless protocol and the	Rofougaran discloses "wherein the first digital signal is encoded using a first wireless protocol and the second digital signal is encoded using a second wireless protocol." See, e.g.:

Claim 13 of the '802 Patent	Prior Art Reference – Rofougaran
second digital signal is encoded using a second wireless protocol.	FIG. 1 is a diagram showing a portion of a first non-limiting exemplary communication system 100, in accordance with various aspects of the present invention. The communication system (or device) may comprise characteristics of any of a variety of communication systems/devices (e.g., multimode wireless communication devices). For example and without limitation, the communication system may comprise characteristics of any of a variety of mobile wireless communication devices (e.g., cellular phones, paging devices, portable email devices, etc.). Also for example, the communication system may comprise characteristics of fixed communication systems or devices (e.g., network access points, base stations, satellites, wireless routers, set top boxes, etc.). Further for example, the communication system may comprise characteristics of a variety of electronic devices with wireless communication capability (e.g., televisions, music players, cameras, remote controls, personal digital assistants, handheld computers, gaming devices, etc.). Accordingly, the scope of various aspects of the present invention should not be limited by characteristics of particular communication systems or devices. The following discussion will, at times, refer to various communication modes. A multimode communication device may, for example, be adapted to communicate in a plurality of such communication modes. For the following discussion, a communication mode may generally be considered to coincide with communication utilizing a particular communication protocol or standard. A non-limiting list of exemplary communication protocols includes various cellular communication protocols (e.g., GSM, GPRS, EDGE, CDMA, WCDMA, TDMA, PDC, etc.), various wireless networking protocols or standards, including WLAN, WMAN, WPAN and WWAN (e.g., IEEE 802.11, Bluetooth, IEEE 802.15, UWB, IEEE 802.16, IEEE 802.20, Zigbee, any WiFi protocol, etc.), various television communication standards, etc. The scope of various aspects of the present invention should not be limited by characteristics of particular communication modes or protocols, whether standard or proprietary. The exemplary communication system 100 may comprise at least a first input 101 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to any of the previously mentioned communication protocols.

Claim 13 of the '802 Patent	Prior Art Reference – Rofougaran
	The exemplary communication system 100 may also comprise at least a second input 102 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first communication protocol discussed above). For example and without limitation, the second baseband signal may correspond to any of the previously mentioned communication protocols. The first baseband signal and the second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of the communication system 100. For example, such modules may generate the first and second baseband signals independently (e.g., corresponding to independent respective communications). Alternatively, for example, such modules may generate the first and second baseband signals in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first and second baseband signals for a single communication). The exemplary communication system 100 may additionally comprise a spectral placement module 110 that is adapted to spectrally shift the first baseband signal (i.e., shift the frequency spectrum of the first baseband signal). In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to spectrally shift the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with the second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to implement a frequency-hopping scheme with the first baseband signal. For example, in a scenario, where there are one or more frequency bands (e.g., a second frequency space) associated with the second baseband signal, the spectral placement module 110 may be adapted to shift the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space.

Claim 13 of the '802 Patent	Prior Art Reference – Rofougaran
	See, e.g., Rofougaran at 2:38-3:58. The exemplary communication system 100 may also comprise a second spectral placement module 120. Such a second spectral placement module 120 may, for example, share any or all characteristics with the spectral placement module 110 discussed previously. The incorporation of such a second spectral placement module 120 may, for example, provide spectral shifting flexibility. For example, in such an exemplary configuration, either or both of the first and second baseband signals may be spectrally shifted to substantially distinct frequency spaces. Also for example, in such an exemplary configuration, either or both of the first and second baseband signals may be frequency hopped. Note that though the second spectral placement module 120 is illustrated separate from the first spectral placement module 110, the second spectral placement module 120 may share any or all hardware and/or software components with the spectral placement module 110. The exemplary communication system 100 may further comprise a signal combiner 130 that is adapted to generate a composite signal comprising various input signals to the signal combiner 130. For example, the composite signal may simultaneously (i.e., at an instant in time) comprise components associated with various input signals. Note that such simultaneity need not always be present. For example, at a first instant in time, the signal output from the signal combiner 130 might comprise a plurality of components associated with a plurality of respective input signals, at a second instant in time, the signal output from the signal combiner 130 might comprise a single component associated with a single respective input signal, and at a third instant in time, the signal output from the signal combiner 130 might comprise no components. In a first non-limiting exemplary scenario, the signal combiner 130 may receive a first signal that is based on the first baseband signal (e.g., associated with a first communication protocol). Also, the signal combiner 130 may receive a second signal that is based on the second baseband signal (e.g., associated with a second communication protocol). In such a scenario, the signal combiner 130 may combine the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the first baseband signal and a second signal component based on the second baseband signal. In such a scenario, for example where the frequency spectra of the first and second baseband signals do not overlap, the first and second

Claim 13 of the ’802 Patent	**Prior Art Reference – Rofougaran**
	baseband signals might not be spectrally shifted prior to combining by the signal combiner 130. In such a scenario, the spectral placement module 110 (and optionally, the second spectral placement module 120) may receive a control signal indicating whether or not to perform spectral shifting and/or to what degree spectral shifting should be implemented. *See, e.g.*, Rofougaran at 4:16-67. Various components of the exemplary communication system 100 (and other communication systems illustrated and discussed herein) may be implemented in analog and/or digital circuitry. To illustrate this, the exemplary communication system 100 is not shown with analog-to-digital converters (ADCs) or digital-to-analog converters (DACs). FIGS. 4-6, to be discussed later, show various non-limiting exemplary configurations including such converters. FIG. 2 is a diagram showing a portion of a second non-limiting exemplary communication system 200, in accordance with various aspects of the present invention. The communication system 200 may, for example and without limitation, share any or all characteristics with the communication system 100 illustrated in FIG. 1 and discussed previously. The exemplary communication system 200 may comprise at least a first input 201 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to the Bluetooth communication protocol. FIG. 2 shows an exemplary frequency spectrum 203 associated with the first baseband signal. The exemplary communication system 200 may also comprise at least a second input 202 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first communication protocol discussed above). For example and without limitation, the first baseband signal may correspond to an IEEE 802.11 communication protocol (e.g., IEEE 802.11(b) or IEEE

Claim 13 of the '802 Patent	Prior Art Reference – Rofougaran
	802.11(g)). FIG. 2 shows an exemplary frequency spectrum 204 associated with the second baseband signal. *See, e.g.*, Rofougaran at 5:64-6:31. In a non-limiting exemplary configuration illustrated in FIG. 2, the signal combiner 230 receives a first signal from the spectral placement module 210 that is based on the spectrally shifted first baseband signal. Also, the signal combiner 230 receives a second signal that is based on the second baseband signal. In such a configuration, the signal combiner 230 combines the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the spectrally shifted first baseband signal and a second signal component based on the second baseband signal (e.g., not spectrally shifted). FIG. 2 shows an exemplary frequency spectrum 231 associated with the composite signal formed by the signal combiner 230. The spectrum 231 comprises a first portion 233 corresponding to the first signal component, and a second portion 232 corresponding to the second signal component. Note that the first portion 233 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 232. The exemplary communication system 200 may also comprise an upconverter 240 adapted to upconvert a signal (e.g., the composite signal from the signal combiner 230) for transmission. The upconverter 240 may, for example and without limitation, share any or all characteristics with the upconverter 140 discussed previously. The upconverter 240 may, for example, comprise a mixer 247, a local oscillator 246 and one or more filters 248. The mixer 247 may, for example, receive the composite signal from the signal combiner 230 and an RF mixing signal at frequency fRF from a local oscillator 246. The upconverter 240 may, for example, filter the upconverted signal from the mixer 247 with one or more filters 248. The output of the upconverter 240 may, for example, comprise a signal indicative of the composite signal spectrally shifted to an RF frequency.

Claim 13 of the '802 Patent	Prior Art Reference – Rofougaran
	FIG. 2 shows an exemplary frequency spectrum 241 associated with the RF signal formed by the upconverter 240. The frequency spectrum 241 comprises a first portion 243 corresponding to the first signal component and a second portion 242 corresponding to the second signal component. Note that the first portion 243 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 242. Also note that the first portion 243 and second portion 242 might be formed with a first mirror portion 244 and second mirror portion 245, respectively. Note that a mirror portion may either be removed or may be kept for later processing. The exemplary communication system 200 may further comprise a RF transmission stage 250 adapted to transmit an RF signal. The RF transmission stage 250 may, for example and without limitation, share any or all characteristics with the RF transmission stage 150 discussed previously. Such an RF signal may, for example, be associated with the composite signal output from the signal combiner 230 and upconverted by the upconverter 240. The RF transmission stage 250 may, for example and without limitation, comprise a power amplifier 252, antenna 254 and other components generally associated with RF signal transmission. *See, e.g.*, Rofougaran at 6:66-7:57. For example, the spectral placement module 510, optional second spectral placement module 520 and signal combiner 530 may operate in the analog domain. The first digital-to-analog converter 592 may convert the first baseband signal to the analog domain for processing by the spectral placement module 510. The second digital-to-analog converter 594 may convert the second baseband signal to the analog domain for processing by the second spectral placement module 520 or signal combiner 530. The signal combiner 530 then combines signals in the analog domain to generate an analog composite signal, which is then upconverted and transmitted by the upconverter 540 and RF transmission stage 550, respectively. *See, e.g.*, Rofougaran at 9:30-41. FIG. 7 is a diagram showing a portion of a seventh non-limiting exemplary communication system 700, in accordance with various aspects of the present invention. The exemplary communication

Claim 13 of the ’802 Patent	**Prior Art Reference – Rofougaran**
	system 700 may, for example and without limitation, share any or all characteristics with the exemplary systems 100-600 illustrated in FIGS. 1-6 and discussed previously. The exemplary communication system 700 may comprise a first mixer 744 that receives a spectrally shifted first baseband signal from the spectral placement module 710 and a first RF mixing signal (e.g., a 2.446 GHz signal generally associated with the Bluetooth communication protocol) from a first local oscillator 742. The exemplary communication system 700 may also comprise a second mixer 748 that receives a second baseband signal (or a spectrally shifted second baseband signal) and a second RF mixing signal (e.g., a 2.486 GHz signal generally associated with the IEEE 802.11(g) communication protocol) from a second local oscillator 746. The exemplary communication system 700 may comprise an RF signal combiner 730 that is adapted to combine input RF signals. The RF signal combiner 730 may, for example, receive and combine the output signals from the first mixer 744 and second mixer 748 to generate an RF composite signal. The exemplary communication system 700 may also comprise a RF transmission stage 750 that receives the RF composite signal from the RF signal combiner 730 and transmit the signal. *See, e.g.*, Rofougaran at 10:18-43. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 810 comprises receiving the first baseband signal, step 810 may comprise receiving the first baseband signal in any manner generally associated with receiving a baseband signal. The first baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 810 may, for example, comprise generating the first baseband signal independently (e.g., corresponding to an independent communication). Step 810 may alternatively, for example, comprise generating the first baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first baseband signal and other baseband signals for a single communication).

Claim 13 of the '802 Patent	Prior Art Reference – Rofougaran
	The exemplary method 800 may, at step 820, comprise spectrally placing (or shifting) the first baseband signal (e.g., received at step 810). Step 820 may, for example and without limitation, share any or all functional characteristics with the spectral placement modules 110-710 of the exemplary systems 100-700 illustrated in FIGS. 1-7 and discussed previously. Step 820 may, for example, comprise spectrally shifting the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with a second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, step 820 may comprise implementing a frequency-hopping scheme with the first baseband signal. For example, in a scenario where there are one or more frequency bands (e.g., a second frequency space) associated with a second baseband signal, step 820 may comprise spectrally shifting the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. In another non-limiting exemplary scenario, spectrally shifting the first baseband signal may result in the production of a spectral image (e.g., frequency content mirrored about a mixing frequency utilized to spectrally shift the first baseband signal). In such a scenario, step 820 may comprise accepting or rejecting the image. In a scenario where an image is rejected, step 820 may comprise rejecting the image in any of a variety of manners. For example and without limitation, step 820 may comprise performing image reject mixing to spectrally shift the first baseband signal. Such image reject mixing generally comprises spectrally shifting a signal and rejecting an image associated with the spectrally shifted signal. Also for example, step 820 may comprise filtering out an unwanted image. The scope of various aspects of the present invention should not be limited by the utilization of image rejection or by any particular manner of performing such image rejection.

Claim 13 of the '802 Patent	Prior Art Reference – Rofougaran
	The exemplary method 800 may, at step 830, comprise generating and/or receiving a second baseband signal corresponding to a second communication protocol (e.g., different from the first communication protocol). Step 830 may, for example and without limitation, share any or all functional characteristics with the second input 102 of the exemplary system 100 illustrated in FIG. 1 and discussed previously. The second baseband signal may, for example, correspond to a second communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 830 comprises receiving the second baseband signal, step 830 may comprise receiving the second baseband signal in any manner generally associated with receiving a baseband signal. The second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 830 may, for example, comprise generating the second baseband signal independently (e.g., corresponding to a communication independent of a communication associated with the first baseband signal). Step 830 may alternatively, for example, comprise generating the second baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the second baseband signal and the first baseband signal for a single communication). *See, e.g.*, Rofougaran at 11:53-13:4. Furthermore, this claim element is obvious in light of Rofougaran itself, when combined with any of the other references as charted for this claim element in Exs. A-1–A-31, First Supplemental Ex. A-Obviousness Chart, and/or when combined with the knowledge of one of ordinary skill in the art. Motivations to combine may come from the knowledge of the person of ordinary skill themselves, or from the known problems and predictable solutions as embodied in these references. Further motivations to combine references and additional details may be found in the Cover Pleading and First Supplemental Ex. A-Obviousness Chart.

Claim 14 of the '802 Patent	Prior Art Reference – Rofougaran
[14.1] The method of claim 10	Rofougaran discloses all the elements of claim 10 for all the reasons provided above.
[14.2] wherein the second data is the same as the first data, the method further comprising:	Rofougaran discloses "wherein the second data is the same as the first data, the method further comprising." See, e.g.: FIG. 1 is a diagram showing a portion of a first non-limiting exemplary communication system 100, in accordance with various aspects of the present invention. The communication system (or device) may comprise characteristics of any of a variety of communication systems/devices (e.g., multimode wireless communication devices). For example and without limitation, the communication system may comprise characteristics of any of a variety of mobile wireless communication devices (e.g., cellular phones, paging devices, portable email devices, etc.). Also for example, the communication system may comprise characteristics of fixed communication systems or devices (e.g., network access points, base stations, satellites, wireless routers, set top boxes, etc.). Further for example, the communication system may comprise characteristics of a variety of electronic devices with wireless communication capability (e.g., televisions, music players, cameras, remote controls, personal digital assistants, handheld computers, gaming devices, etc.). Accordingly, the scope of various aspects of the present invention should not be limited by characteristics of particular communication systems or devices. The following discussion will, at times, refer to various communication modes. A multimode communication device may, for example, be adapted to communicate in a plurality of such communication modes. For the following discussion, a communication mode may generally be considered to coincide with communication utilizing a particular communication protocol or standard. A non-limiting list of exemplary communication protocols includes various cellular communication protocols (e.g., GSM, GPRS, EDGE, CDMA, WCDMA, TDMA, PDC, etc.), various wireless networking protocols or standards, including WLAN, WMAN, WPAN and WWAN (e.g., IEEE 802.11, Bluetooth, IEEE 802.15, UWB, IEEE 802.16, IEEE 802.20, Zigbee, any WiFi protocol, etc.), various television communication standards, etc. The scope of various aspects of the present invention should not be limited by characteristics of particular communication modes or protocols, whether standard or proprietary.

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	The exemplary communication system 100 may comprise at least a first input 101 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to any of the previously mentioned communication protocols. The exemplary communication system 100 may also comprise at least a second input 102 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first communication protocol discussed above). For example and without limitation, the second baseband signal may correspond to any of the previously mentioned communication protocols. The first baseband signal and the second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of the communication system 100. For example, such modules may generate the first and second baseband signals independently (e.g., corresponding to independent respective communications). Alternatively, for example, such modules may generate the first and second baseband signals in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first and second baseband signals for a single communication). The exemplary communication system 100 may additionally comprise a spectral placement module 110 that is adapted to spectrally shift the first baseband signal (i.e., shift the frequency spectrum of the first baseband signal). In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to spectrally shift the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with the second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to implement a frequency-hopping scheme with the first baseband signal. For example, in a scenario,

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	where there are one or more frequency bands (e.g., a second frequency space) associated with the second baseband signal, the spectral placement module 110 may be adapted to shift the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. *See, e.g.*, Rofougaran at 2:38-3:58. The exemplary communication system 100 may also comprise a second spectral placement module 120. Such a second spectral placement module 120 may, for example, share any or all characteristics with the spectral placement module 110 discussed previously. The incorporation of such a second spectral placement module 120 may, for example, provide spectral shifting flexibility. For example, in such an exemplary configuration, either or both of the first and second baseband signals may be spectrally shifted to substantially distinct frequency spaces. Also for example, in such an exemplary configuration, either or both of the first and second baseband signals may be frequency hopped. Note that though the second spectral placement module 120 is illustrated separate from the first spectral placement module 110, the second spectral placement module 120 may share any or all hardware and/or software components with the spectral placement module 110. The exemplary communication system 100 may further comprise a signal combiner 130 that is adapted to generate a composite signal comprising various input signals to the signal combiner 130. For example, the composite signal may simultaneously (i.e., at an instant in time) comprise components associated with various input signals. Note that such simultaneity need not always be present. For example, at a first instant in time, the signal output from the signal combiner 130 might comprise a plurality of components associated with a plurality of respective input signals, at a second instant in time, the signal output from the signal combiner 130 might comprise a single component associated with a single respective input signal, and at a third instant in time, the signal output from the signal combiner 130 might comprise no components. In a first non-limiting exemplary scenario, the signal combiner 130 may receive a first signal that is based on the first baseband signal (e.g., associated with a first communication protocol). Also, the signal combiner 130 may receive a second signal that is based on the second baseband signal (e.g.,

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	associated with a second communication protocol). In such a scenario, the signal combiner 130 may combine the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the first baseband signal and a second signal component based on the second baseband signal. In such a scenario, for example where the frequency spectra of the first and second baseband signals do not overlap, the first and second baseband signals might not be spectrally shifted prior to combining by the signal combiner 130. In such a scenario, the spectral placement module 110 (and optionally, the second spectral placement module 120) may receive a control signal indicating whether or not to perform spectral shifting and/or to what degree spectral shifting should be implemented. *See, e.g.*, Rofougaran at 4:16-67. Various components of the exemplary communication system 100 (and other communication systems illustrated and discussed herein) may be implemented in analog and/or digital circuitry. To illustrate this, the exemplary communication system 100 is not shown with analog-to-digital converters (ADCs) or digital-to-analog converters (DACs). FIGS. 4-6, to be discussed later, show various non-limiting exemplary configurations including such converters. FIG. 2 is a diagram showing a portion of a second non-limiting exemplary communication system 200, in accordance with various aspects of the present invention. The communication system 200 may, for example and without limitation, share any or all characteristics with the communication system 100 illustrated in FIG. 1 and discussed previously. The exemplary communication system 200 may comprise at least a first input 201 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to the Bluetooth communication protocol. FIG. 2 shows an exemplary frequency spectrum 203 associated with the first baseband signal.

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	The exemplary communication system 200 may also comprise at least a second input 202 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first communication protocol discussed above). For example and without limitation, the first baseband signal may correspond to an IEEE 802.11 communication protocol (e.g., IEEE 802.11(b) or IEEE 802.11(g)). FIG. 2 shows an exemplary frequency spectrum 204 associated with the second baseband signal. *See*, *e.g.*, Rofougaran at 5:64-6:31. In a non-limiting exemplary configuration illustrated in FIG. 2, the signal combiner 230 receives a first signal from the spectral placement module 210 that is based on the spectrally shifted first baseband signal. Also, the signal combiner 230 receives a second signal that is based on the second baseband signal. In such a configuration, the signal combiner 230 combines the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the spectrally shifted first baseband signal and a second signal component based on the second baseband signal (e.g., not spectrally shifted). FIG. 2 shows an exemplary frequency spectrum 231 associated with the composite signal formed by the signal combiner 230. The spectrum 231 comprises a first portion 233 corresponding to the first signal component, and a second portion 232 corresponding to the second signal component. Note that the first portion 233 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 232. The exemplary communication system 200 may also comprise an upconverter 240 adapted to upconvert a signal (e.g., the composite signal from the signal combiner 230) for transmission. The upconverter 240 may, for example and without limitation, share any or all characteristics with the upconverter 140 discussed previously. The upconverter 240 may, for example, comprise a mixer 247, a local oscillator 246 and one or more filters 248. The mixer 247 may, for example, receive the composite signal from the signal combiner

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	230 and an RF mixing signal at frequency fRF from a local oscillator 246. The upconverter 240 may, for example, filter the upconverted signal from the mixer 247 with one or more filters 248. The output of the upconverter 240 may, for example, comprise a signal indicative of the composite signal spectrally shifted to an RF frequency. FIG. 2 shows an exemplary frequency spectrum 241 associated with the RF signal formed by the upconverter 240. The frequency spectrum 241 comprises a first portion 243 corresponding to the first signal component and a second portion 242 corresponding to the second signal component. Note that the first portion 243 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 242. Also note that the first portion 243 and second portion 242 might be formed with a first mirror portion 244 and second mirror portion 245, respectively. Note that a mirror portion may either be removed or may be kept for later processing. The exemplary communication system 200 may further comprise a RF transmission stage 250 adapted to transmit an RF signal. The RF transmission stage 250 may, for example and without limitation, share any or all characteristics with the RF transmission stage 150 discussed previously. Such an RF signal may, for example, be associated with the composite signal output from the signal combiner 230 and upconverted by the upconverter 240. The RF transmission stage 250 may, for example and without limitation, comprise a power amplifier 252, antenna 254 and other components generally associated with RF signal transmission. *See, e.g.*, Rofougaran at 6:66-7:57. For example, the spectral placement module 510, optional second spectral placement module 520 and signal combiner 530 may operate in the analog domain. The first digital-to-analog converter 592 may convert the first baseband signal to the analog domain for processing by the spectral placement module 510. The second digital-to-analog converter 594 may convert the second baseband signal to the analog domain for processing by the second spectral placement module 520 or signal combiner 530. The signal combiner 530 then combines signals in the analog domain to generate an analog composite signal, which is then upconverted and transmitted by the upconverter 540 and RF transmission stage 550, respectively.

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	See, e.g., Rofougaran at 9:30-41. FIG. 7 is a diagram showing a portion of a seventh non-limiting exemplary communication system 700, in accordance with various aspects of the present invention. The exemplary communication system 700 may, for example and without limitation, share any or all characteristics with the exemplary systems 100-600 illustrated in FIGS. 1-6 and discussed previously. The exemplary communication system 700 may comprise a first mixer 744 that receives a spectrally shifted first baseband signal from the spectral placement module 710 and a first RF mixing signal (e.g., a 2.446 GHz signal generally associated with the Bluetooth communication protocol) from a first local oscillator 742. The exemplary communication system 700 may also comprise a second mixer 748 that receives a second baseband signal (or a spectrally shifted second baseband signal) and a second RF mixing signal (e.g., a 2.486 GHz signal generally associated with the IEEE 802.11(g) communication protocol) from a second local oscillator 746. The exemplary communication system 700 may comprise an RF signal combiner 730 that is adapted to combine input RF signals. The RF signal combiner 730 may, for example, receive and combine the output signals from the first mixer 744 and second mixer 748 to generate an RF composite signal. The exemplary communication system 700 may also comprise a RF transmission stage 750 that receives the RF composite signal from the RF signal combiner 730 and transmit the signal. *See, e.g.*, Rofougaran at 10:18-43. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 810 comprises receiving the first baseband signal, step 810 may comprise receiving the first baseband signal in any manner generally associated with receiving a baseband signal. The first baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 810 may, for example, comprise generating the first baseband signal independently (e.g.,

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	corresponding to an independent communication). Step 810 may alternatively, for example, comprise generating the first baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first baseband signal and other baseband signals for a single communication). The exemplary method 800 may, at step 820, comprise spectrally placing (or shifting) the first baseband signal (e.g., received at step 810). Step 820 may, for example and without limitation, share any or all functional characteristics with the spectral placement modules 110-710 of the exemplary systems 100-700 illustrated in FIGS. 1-7 and discussed previously. Step 820 may, for example, comprise spectrally shifting the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with a second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, step 820 may comprise implementing a frequency-hopping scheme with the first baseband signal. For example, in a scenario where there are one or more frequency bands (e.g., a second frequency space) associated with a second baseband signal, step 820 may comprise spectrally shifting the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. In another non-limiting exemplary scenario, spectrally shifting the first baseband signal may result in the production of a spectral image (e.g., frequency content mirrored about a mixing frequency utilized to spectrally shift the first baseband signal). In such a scenario, step 820 may comprise accepting or rejecting the image. In a scenario where an image is rejected, step 820 may comprise rejecting the image in any of a variety of manners. For example and without limitation, step 820 may comprise performing image reject mixing to spectrally shift the first baseband signal. Such image reject mixing generally

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	comprises spectrally shifting a signal and rejecting an image associated with the spectrally shifted signal. Also for example, step 820 may comprise filtering out an unwanted image. The scope of various aspects of the present invention should not be limited by the utilization of image rejection or by any particular manner of performing such image rejection. The exemplary method 800 may, at step 830, comprise generating and/or receiving a second baseband signal corresponding to a second communication protocol (e.g., different from the first communication protocol). Step 830 may, for example and without limitation, share any or all functional characteristics with the second input 102 of the exemplary system 100 illustrated in FIG. 1 and discussed previously. The second baseband signal may, for example, correspond to a second communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 830 comprises receiving the second baseband signal, step 830 may comprise receiving the second baseband signal in any manner generally associated with receiving a baseband signal. The second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 830 may, for example, comprise generating the second baseband signal independently (e.g., corresponding to a communication independent of a communication associated with the first baseband signal). Step 830 may alternatively, for example, comprise generating the second baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the second baseband signal and the first baseband signal for a single communication). *See, e.g.*, Rofougaran at 11:53-13:4. Furthermore, this claim element is obvious in light of Rofougaran itself, when combined with any of the other references as charted for this claim element in Exs. A-1–A-31, First Supplemental Ex. A-Obviousness Chart, and/or when combined with the knowledge of one of ordinary skill in the art. Motivations to combine may come from the knowledge of the person of ordinary skill themselves, or from the known problems and predictable solutions as embodied in these references. Further

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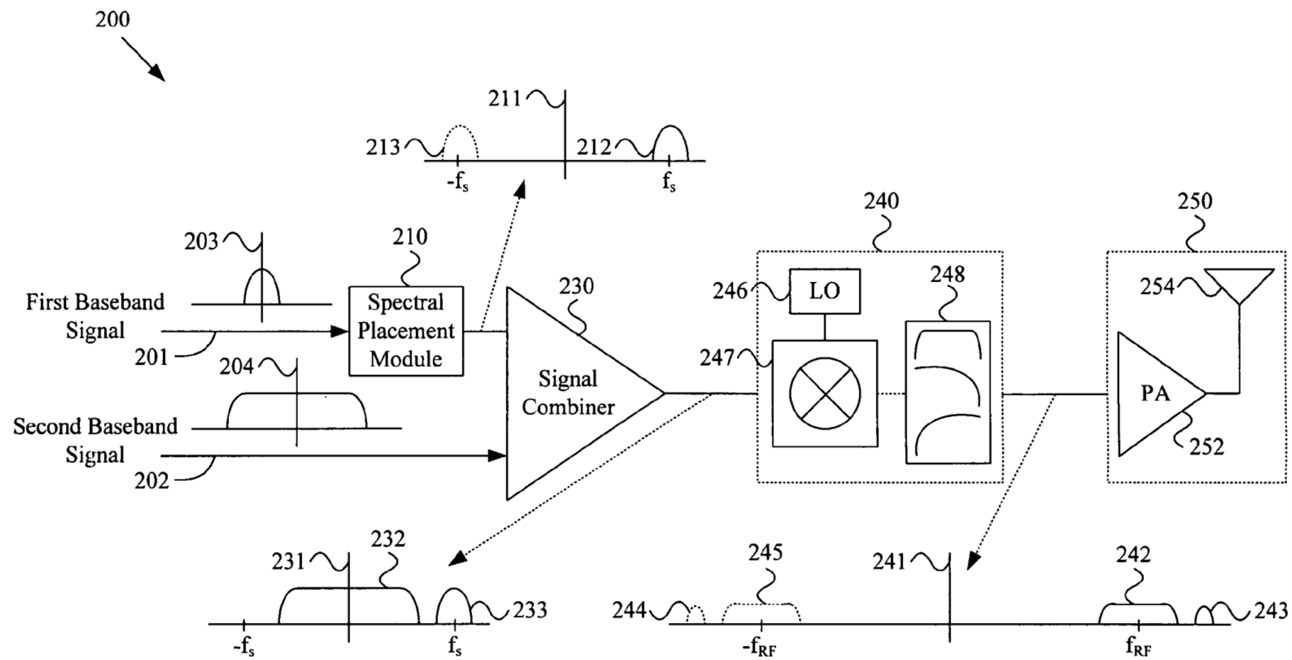
	motivations to combine references and additional details may be found in the Cover Pleading and First Supplemental Ex. A-Obviousness Chart.
[14.3] receiving the transmitted signal on a second antenna;	Rofougaran discloses "receiving the transmitted signal on a second antenna." See, e.g.:  Figure 2 *See, e.g.*, Rofougaran at Figure 2.

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	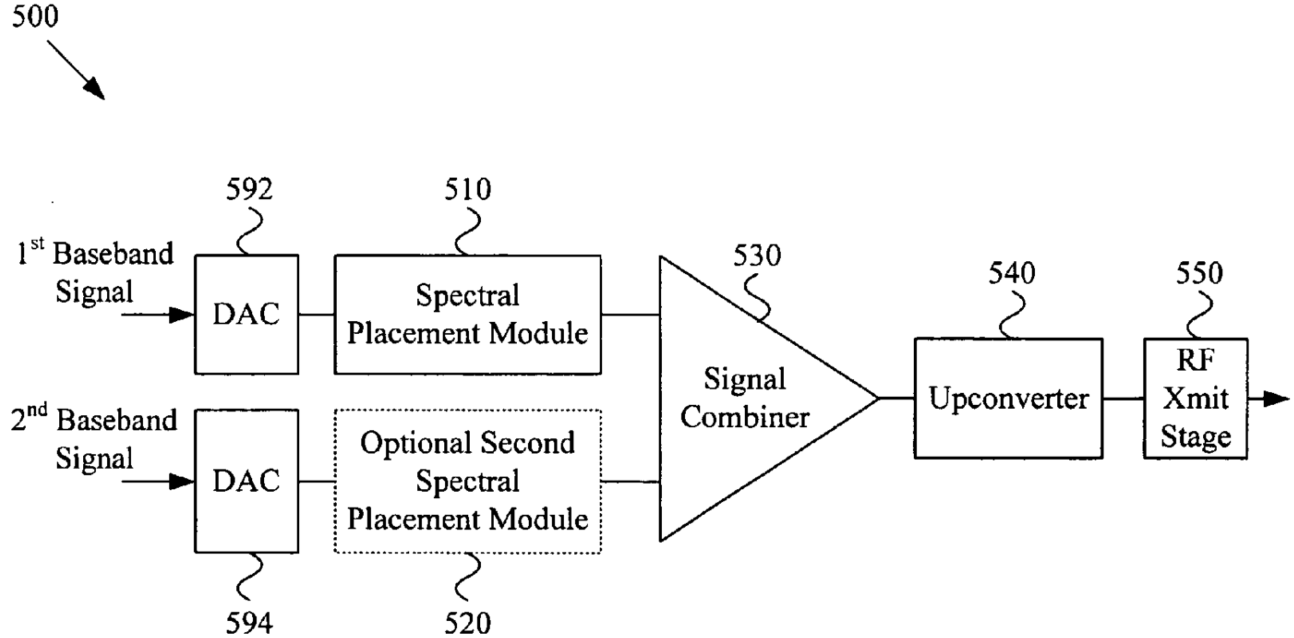 Figure 5 *See, e.g.*, Rofougaran at Figure 5.

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	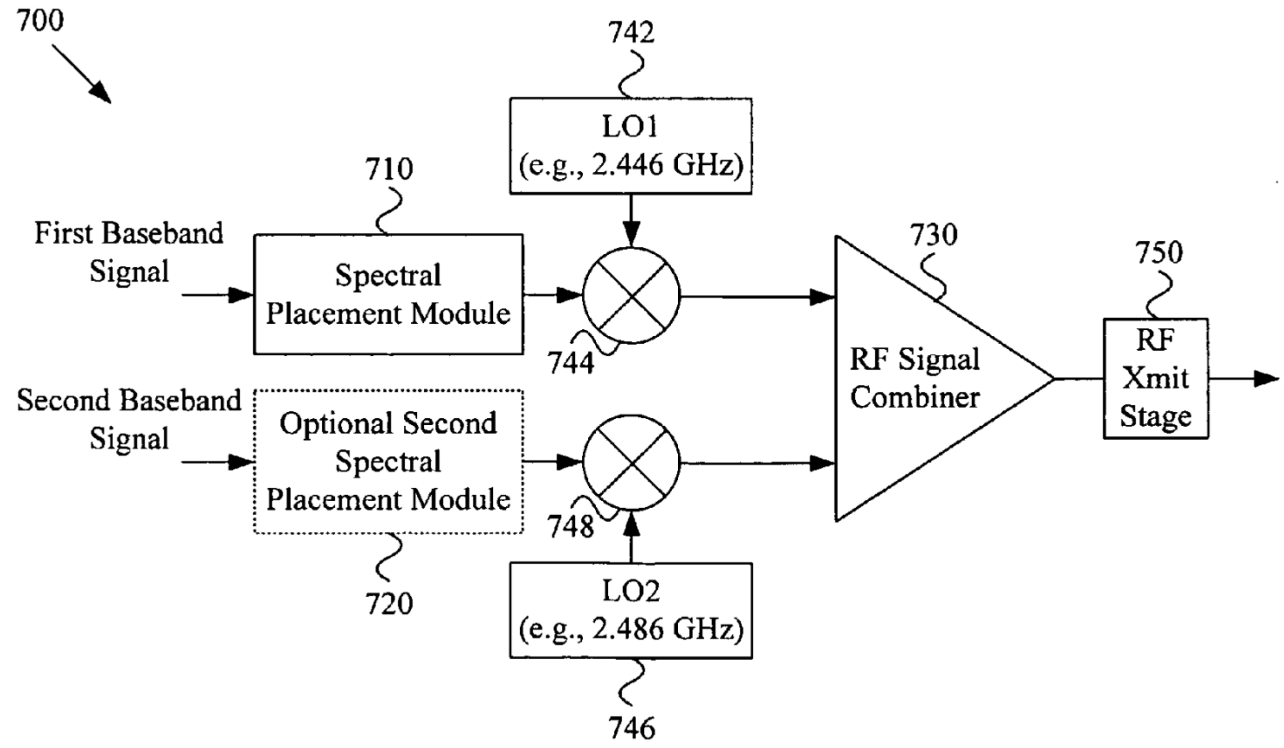 Figure 7 *See, e.g.*, Rofougaran at Figure 7. FIG. 1 is a diagram showing a portion of a first non-limiting exemplary communication system 100, in accordance with various aspects of the present invention. The communication system (or device) may comprise characteristics of any of a variety of communication systems/devices (e.g., multimode wireless communication devices). For example and without limitation, the communication system may comprise characteristics of any of a variety of mobile wireless communication devices (e.g.,

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	cellular phones, paging devices, portable email devices, etc.). Also for example, the communication system may comprise characteristics of fixed communication systems or devices (e.g., network access points, base stations, satellites, wireless routers, set top boxes, etc.). Further for example, the communication system may comprise characteristics of a variety of electronic devices with wireless communication capability (e.g., televisions, music players, cameras, remote controls, personal digital assistants, handheld computers, gaming devices, etc.). Accordingly, the scope of various aspects of the present invention should not be limited by characteristics of particular communication systems or devices. The following discussion will, at times, refer to various communication modes. A multimode communication device may, for example, be adapted to communicate in a plurality of such communication modes. For the following discussion, a communication mode may generally be considered to coincide with communication utilizing a particular communication protocol or standard. A non-limiting list of exemplary communication protocols includes various cellular communication protocols (e.g., GSM, GPRS, EDGE, CDMA, WCDMA, TDMA, PDC, etc.), various wireless networking protocols or standards, including WLAN, WMAN, WPAN and WWAN (e.g., IEEE 802.11, Bluetooth, IEEE 802.15, UWB, IEEE 802.16, IEEE 802.20, Zigbee, any WiFi protocol, etc.), various television communication standards, etc. The scope of various aspects of the present invention should not be limited by characteristics of particular communication modes or protocols, whether standard or proprietary. The exemplary communication system 100 may comprise at least a first input 101 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to any of the previously mentioned communication protocols. The exemplary communication system 100 may also comprise at least a second input 102 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first

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	communication protocol discussed above). For example and without limitation, the second baseband signal may correspond to any of the previously mentioned communication protocols. The first baseband signal and the second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of the communication system 100. For example, such modules may generate the first and second baseband signals independently (e.g., corresponding to independent respective communications). Alternatively, for example, such modules may generate the first and second baseband signals in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first and second baseband signals for a single communication). The exemplary communication system 100 may additionally comprise a spectral placement module 110 that is adapted to spectrally shift the first baseband signal (i.e., shift the frequency spectrum of the first baseband signal). In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to spectrally shift the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with the second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to implement a frequency-hopping scheme with the first baseband signal. For example, in a scenario, where there are one or more frequency bands (e.g., a second frequency space) associated with the second baseband signal, the spectral placement module 110 may be adapted to shift the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. *See, e.g.*, Rofougaran at 2:38-3:58. The exemplary communication system 100 may also comprise a second spectral placement module 120. Such a second spectral placement module 120 may, for example, share any or all characteristics

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	with the spectral placement module 110 discussed previously. The incorporation of such a second spectral placement module 120 may, for example, provide spectral shifting flexibility. For example, in such an exemplary configuration, either or both of the first and second baseband signals may be spectrally shifted to substantially distinct frequency spaces. Also for example, in such an exemplary configuration, either or both of the first and second baseband signals may be frequency hopped. Note that though the second spectral placement module 120 is illustrated separate from the first spectral placement module 110, the second spectral placement module 120 may share any or all hardware and/or software components with the spectral placement module 110. The exemplary communication system 100 may further comprise a signal combiner 130 that is adapted to generate a composite signal comprising various input signals to the signal combiner 130. For example, the composite signal may simultaneously (i.e., at an instant in time) comprise components associated with various input signals. Note that such simultaneity need not always be present. For example, at a first instant in time, the signal output from the signal combiner 130 might comprise a plurality of components associated with a plurality of respective input signals, at a second instant in time, the signal output from the signal combiner 130 might comprise a single component associated with a single respective input signal, and at a third instant in time, the signal output from the signal combiner 130 might comprise no components. In a first non-limiting exemplary scenario, the signal combiner 130 may receive a first signal that is based on the first baseband signal (e.g., associated with a first communication protocol). Also, the signal combiner 130 may receive a second signal that is based on the second baseband signal (e.g., associated with a second communication protocol). In such a scenario, the signal combiner 130 may combine the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the first baseband signal and a second signal component based on the second baseband signal. In such a scenario, for example where the frequency spectra of the first and second baseband signals do not overlap, the first and second baseband signals might not be spectrally shifted prior to combining by the signal combiner 130. In such a scenario, the spectral placement module 110 (and optionally, the second spectral placement module 120) may receive a control signal indicating whether or not to perform spectral shifting and/or to what degree spectral shifting should be implemented.

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	See, e.g., Rofougaran at 4:16-67. Various components of the exemplary communication system 100 (and other communication systems illustrated and discussed herein) may be implemented in analog and/or digital circuitry. To illustrate this, the exemplary communication system 100 is not shown with analog-to-digital converters (ADCs) or digital-to-analog converters (DACs). FIGS. 4-6, to be discussed later, show various non-limiting exemplary configurations including such converters. FIG. 2 is a diagram showing a portion of a second non-limiting exemplary communication system 200, in accordance with various aspects of the present invention. The communication system 200 may, for example and without limitation, share any or all characteristics with the communication system 100 illustrated in FIG. 1 and discussed previously. The exemplary communication system 200 may comprise at least a first input 201 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to the Bluetooth communication protocol. FIG. 2 shows an exemplary frequency spectrum 203 associated with the first baseband signal. The exemplary communication system 200 may also comprise at least a second input 202 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first communication protocol discussed above). For example and without limitation, the first baseband signal may correspond to an IEEE 802.11 communication protocol (e.g., IEEE 802.11(b) or IEEE 802.11(g)). FIG. 2 shows an exemplary frequency spectrum 204 associated with the second baseband signal. *See, e.g.*, Rofougaran at 5:64-6:31.

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	In a non-limiting exemplary configuration illustrated in FIG. 2, the signal combiner 230 receives a first signal from the spectral placement module 210 that is based on the spectrally shifted first baseband signal. Also, the signal combiner 230 receives a second signal that is based on the second baseband signal. In such a configuration, the signal combiner 230 combines the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the spectrally shifted first baseband signal and a second signal component based on the second baseband signal (e.g., not spectrally shifted). FIG. 2 shows an exemplary frequency spectrum 231 associated with the composite signal formed by the signal combiner 230. The spectrum 231 comprises a first portion 233 corresponding to the first signal component, and a second portion 232 corresponding to the second signal component. Note that the first portion 233 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 232. The exemplary communication system 200 may also comprise an upconverter 240 adapted to upconvert a signal (e.g., the composite signal from the signal combiner 230) for transmission. The upconverter 240 may, for example and without limitation, share any or all characteristics with the upconverter 140 discussed previously. The upconverter 240 may, for example, comprise a mixer 247, a local oscillator 246 and one or more filters 248. The mixer 247 may, for example, receive the composite signal from the signal combiner 230 and an RF mixing signal at frequency fRF from a local oscillator 246. The upconverter 240 may, for example, filter the upconverted signal from the mixer 247 with one or more filters 248. The output of the upconverter 240 may, for example, comprise a signal indicative of the composite signal spectrally shifted to an RF frequency. FIG. 2 shows an exemplary frequency spectrum 241 associated with the RF signal formed by the upconverter 240. The frequency spectrum 241 comprises a first portion 243 corresponding to the first signal component and a second portion 242 corresponding to the second signal component. Note that the first portion 243 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 242. Also note that the first portion 243 and

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	second portion 242 might be formed with a first mirror portion 244 and second mirror portion 245, respectively. Note that a mirror portion may either be removed or may be kept for later processing. The exemplary communication system 200 may further comprise a RF transmission stage 250 adapted to transmit an RF signal. The RF transmission stage 250 may, for example and without limitation, share any or all characteristics with the RF transmission stage 150 discussed previously. Such an RF signal may, for example, be associated with the composite signal output from the signal combiner 230 and upconverted by the upconverter 240. The RF transmission stage 250 may, for example and without limitation, comprise a power amplifier 252, antenna 254 and other components generally associated with RF signal transmission. *See, e.g.*, Rofougaran at 6:66-7:57. For example, the spectral placement module 510, optional second spectral placement module 520 and signal combiner 530 may operate in the analog domain. The first digital-to-analog converter 592 may convert the first baseband signal to the analog domain for processing by the spectral placement module 510. The second digital-to-analog converter 594 may convert the second baseband signal to the analog domain for processing by the second spectral placement module 520 or signal combiner 530. The signal combiner 530 then combines signals in the analog domain to generate an analog composite signal, which is then upconverted and transmitted by the upconverter 540 and RF transmission stage 550, respectively. *See, e.g.*, Rofougaran at 9:30-41. FIG. 7 is a diagram showing a portion of a seventh non-limiting exemplary communication system 700, in accordance with various aspects of the present invention. The exemplary communication system 700 may, for example and without limitation, share any or all characteristics with the exemplary systems 100-600 illustrated in FIGS. 1-6 and discussed previously. The exemplary communication system 700 may comprise a first mixer 744 that receives a spectrally shifted first baseband signal from the spectral placement module 710 and a first RF mixing signal (e.g., a 2.446 GHz signal generally associated with the Bluetooth communication protocol) from a

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	first local oscillator 742. The exemplary communication system 700 may also comprise a second mixer 748 that receives a second baseband signal (or a spectrally shifted second baseband signal) and a second RF mixing signal (e.g., a 2.486 GHz signal generally associated with the IEEE 802.11(g) communication protocol) from a second local oscillator 746. The exemplary communication system 700 may comprise an RF signal combiner 730 that is adapted to combine input RF signals. The RF signal combiner 730 may, for example, receive and combine the output signals from the first mixer 744 and second mixer 748 to generate an RF composite signal. The exemplary communication system 700 may also comprise a RF transmission stage 750 that receives the RF composite signal from the RF signal combiner 730 and transmit the signal. *See, e.g.*, Rofougaran at 10:18-43. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 810 comprises receiving the first baseband signal, step 810 may comprise receiving the first baseband signal in any manner generally associated with receiving a baseband signal. The first baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 810 may, for example, comprise generating the first baseband signal independently (e.g., corresponding to an independent communication). Step 810 may alternatively, for example, comprise generating the first baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first baseband signal and other baseband signals for a single communication). The exemplary method 800 may, at step 820, comprise spectrally placing (or shifting) the first baseband signal (e.g., received at step 810). Step 820 may, for example and without limitation, share any or all functional characteristics with the spectral placement modules 110-710 of the exemplary systems 100-700 illustrated in FIGS. 1-7 and discussed previously.

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	Step 820 may, for example, comprise spectrally shifting the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with a second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, step 820 may comprise implementing a frequency-hopping scheme with the first baseband signal. For example, in a scenario where there are one or more frequency bands (e.g., a second frequency space) associated with a second baseband signal, step 820 may comprise spectrally shifting the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. In another non-limiting exemplary scenario, spectrally shifting the first baseband signal may result in the production of a spectral image (e.g., frequency content mirrored about a mixing frequency utilized to spectrally shift the first baseband signal). In such a scenario, step 820 may comprise accepting or rejecting the image. In a scenario where an image is rejected, step 820 may comprise rejecting the image in any of a variety of manners. For example and without limitation, step 820 may comprise performing image reject mixing to spectrally shift the first baseband signal. Such image reject mixing generally comprises spectrally shifting a signal and rejecting an image associated with the spectrally shifted signal. Also for example, step 820 may comprise filtering out an unwanted image. The scope of various aspects of the present invention should not be limited by the utilization of image rejection or by any particular manner of performing such image rejection. The exemplary method 800 may, at step 830, comprise generating and/or receiving a second baseband signal corresponding to a second communication protocol (e.g., different from the first communication protocol). Step 830 may, for example and without limitation, share any or all functional characteristics with the second input 102 of the exemplary system 100 illustrated in FIG. 1 and discussed previously.

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	The second baseband signal may, for example, correspond to a second communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 830 comprises receiving the second baseband signal, step 830 may comprise receiving the second baseband signal in any manner generally associated with receiving a baseband signal. The second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 830 may, for example, comprise generating the second baseband signal independently (e.g., corresponding to a communication independent of a communication associated with the first baseband signal). Step 830 may alternatively, for example, comprise generating the second baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the second baseband signal and the first baseband signal for a single communication). *See, e.g.*, Rofougaran at 11:53-13:4. Furthermore, this claim element is obvious in light of Rofougaran itself, when combined with any of the other references as charted for this claim element in Exs. A-1–A-31, First Supplemental Ex. A-Obviousness Chart, and/or when combined with the knowledge of one of ordinary skill in the art. Motivations to combine may come from the knowledge of the person of ordinary skill themselves, or from the known problems and predictable solutions as embodied in these references. Further motivations to combine references and additional details may be found in the Cover Pleading and First Supplemental Ex. A-Obviousness Chart.
[14.4] amplifying the received signal in a low noise amplifier resulting in an amplified received up-converted signal, wherein the bandwidth of said low noise amplifier is greater than the difference between the lowest frequency in the	Rofougaran discloses “amplifying the received signal in a low noise amplifier resulting in an amplified received up-converted signal, wherein the bandwidth of said low noise amplifier is greater than the difference between the lowest frequency in the first up-converted frequency range and the highest frequency in the second up-converted frequency range.” See, e.g.:

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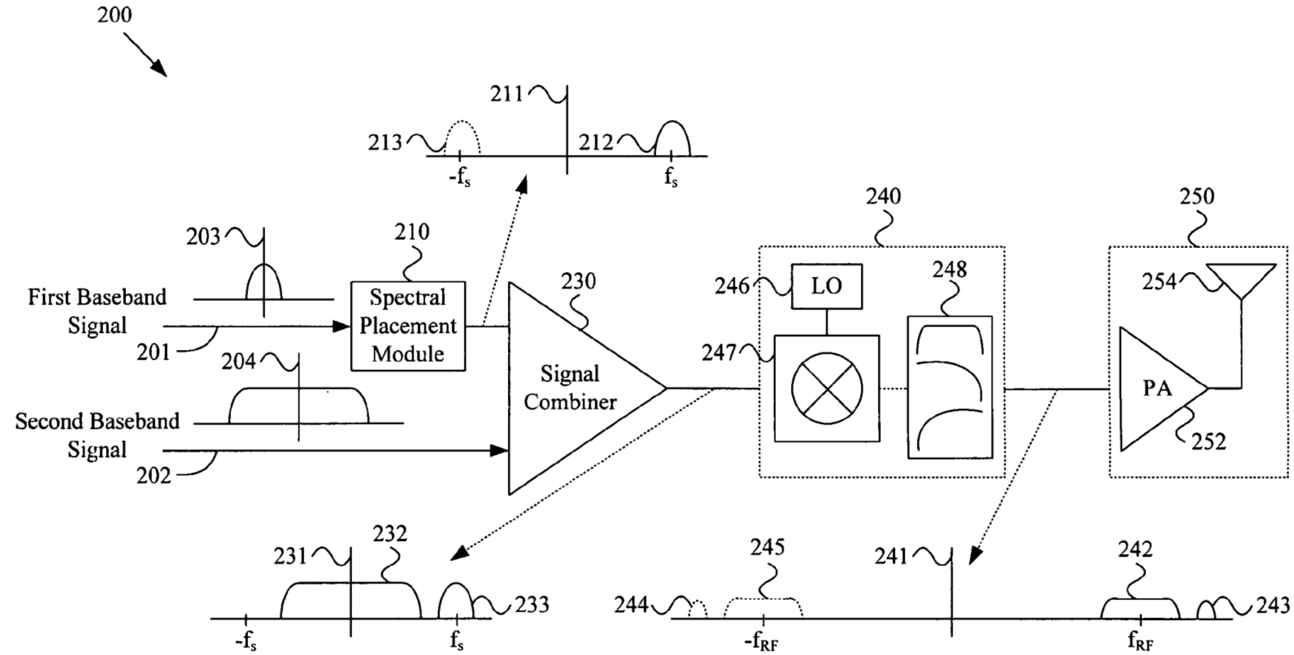
first up-converted frequency range and the highest frequency in the second up-converted frequency range;	 Figure 2 *See, e.g.*, Rofougaran at Figure 2.

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	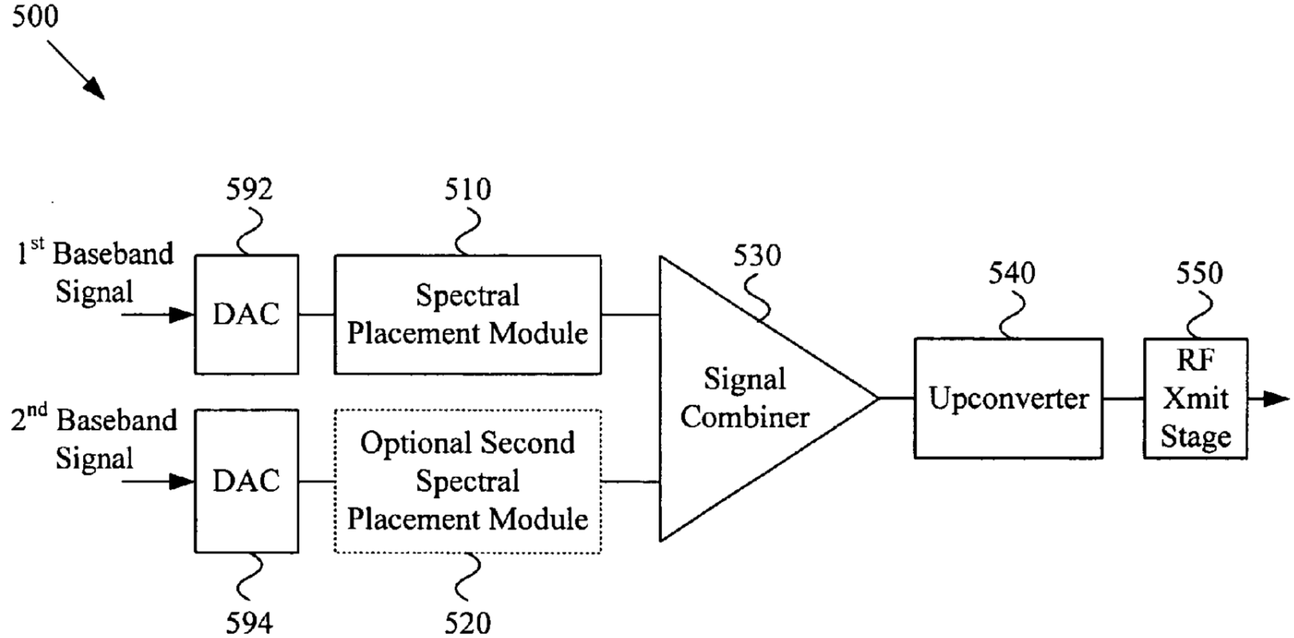 Figure 5 *See, e.g.*, Rofougaran at Figure 5.

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	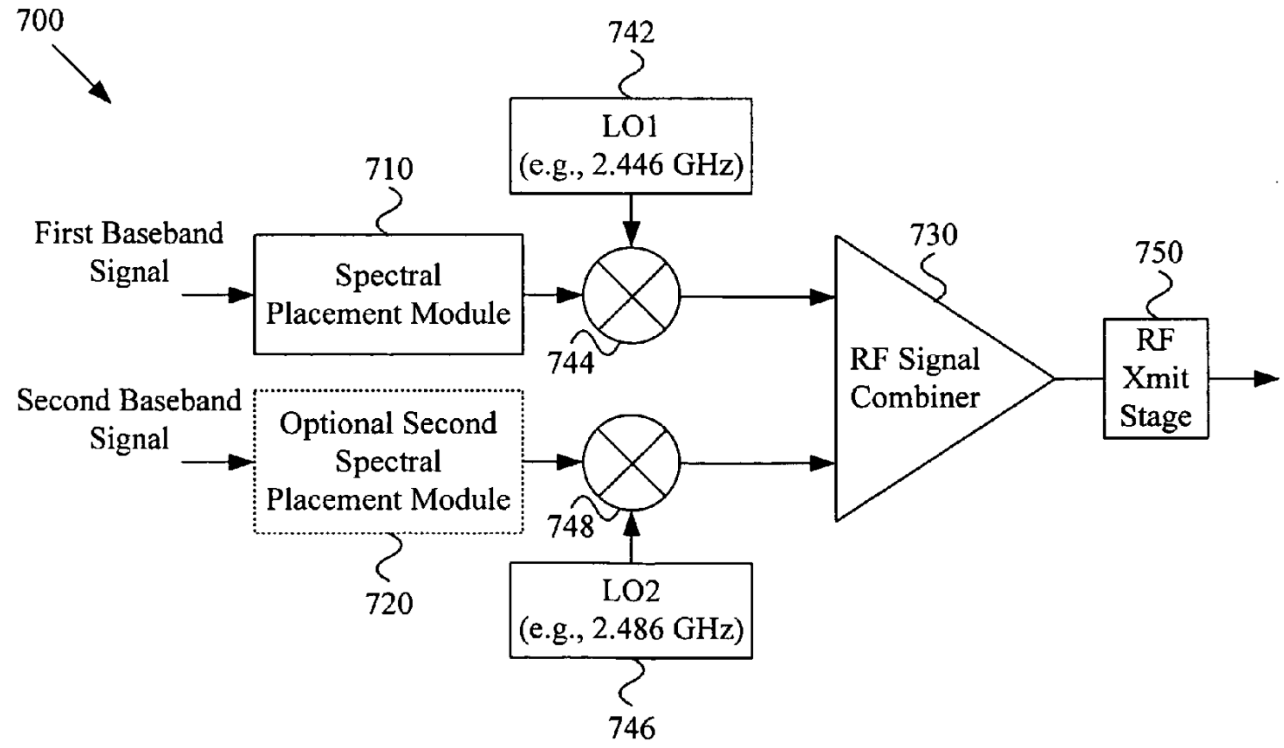 Figure 7 *See, e.g.*, Rofougaran at Figure 7. FIG. 1 is a diagram showing a portion of a first non-limiting exemplary communication system 100, in accordance with various aspects of the present invention. The communication system (or device) may comprise characteristics of any of a variety of communication systems/devices (e.g., multimode wireless communication devices). For example and without limitation, the communication system may comprise characteristics of any of a variety of mobile wireless communication devices (e.g.,

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	cellular phones, paging devices, portable email devices, etc.). Also for example, the communication system may comprise characteristics of fixed communication systems or devices (e.g., network access points, base stations, satellites, wireless routers, set top boxes, etc.). Further for example, the communication system may comprise characteristics of a variety of electronic devices with wireless communication capability (e.g., televisions, music players, cameras, remote controls, personal digital assistants, handheld computers, gaming devices, etc.). Accordingly, the scope of various aspects of the present invention should not be limited by characteristics of particular communication systems or devices. The following discussion will, at times, refer to various communication modes. A multimode communication device may, for example, be adapted to communicate in a plurality of such communication modes. For the following discussion, a communication mode may generally be considered to coincide with communication utilizing a particular communication protocol or standard. A non-limiting list of exemplary communication protocols includes various cellular communication protocols (e.g., GSM, GPRS, EDGE, CDMA, WCDMA, TDMA, PDC, etc.), various wireless networking protocols or standards, including WLAN, WMAN, WPAN and WWAN (e.g., IEEE 802.11, Bluetooth, IEEE 802.15, UWB, IEEE 802.16, IEEE 802.20, Zigbee, any WiFi protocol, etc.), various television communication standards, etc. The scope of various aspects of the present invention should not be limited by characteristics of particular communication modes or protocols, whether standard or proprietary. The exemplary communication system 100 may comprise at least a first input 101 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to any of the previously mentioned communication protocols. The exemplary communication system 100 may also comprise at least a second input 102 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first

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	communication protocol discussed above). For example and without limitation, the second baseband signal may correspond to any of the previously mentioned communication protocols. The first baseband signal and the second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of the communication system 100. For example, such modules may generate the first and second baseband signals independently (e.g., corresponding to independent respective communications). Alternatively, for example, such modules may generate the first and second baseband signals in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first and second baseband signals for a single communication). The exemplary communication system 100 may additionally comprise a spectral placement module 110 that is adapted to spectrally shift the first baseband signal (i.e., shift the frequency spectrum of the first baseband signal). In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to spectrally shift the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with the second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to implement a frequency-hopping scheme with the first baseband signal. For example, in a scenario, where there are one or more frequency bands (e.g., a second frequency space) associated with the second baseband signal, the spectral placement module 110 may be adapted to shift the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. *See, e.g.*, Rofougaran at 2:38-3:58. The exemplary communication system 100 may also comprise a second spectral placement module 120. Such a second spectral placement module 120 may, for example, share any or all characteristics

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	with the spectral placement module 110 discussed previously. The incorporation of such a second spectral placement module 120 may, for example, provide spectral shifting flexibility. For example, in such an exemplary configuration, either or both of the first and second baseband signals may be spectrally shifted to substantially distinct frequency spaces. Also for example, in such an exemplary configuration, either or both of the first and second baseband signals may be frequency hopped. Note that though the second spectral placement module 120 is illustrated separate from the first spectral placement module 110, the second spectral placement module 120 may share any or all hardware and/or software components with the spectral placement module 110. The exemplary communication system 100 may further comprise a signal combiner 130 that is adapted to generate a composite signal comprising various input signals to the signal combiner 130. For example, the composite signal may simultaneously (i.e., at an instant in time) comprise components associated with various input signals. Note that such simultaneity need not always be present. For example, at a first instant in time, the signal output from the signal combiner 130 might comprise a plurality of components associated with a plurality of respective input signals, at a second instant in time, the signal output from the signal combiner 130 might comprise a single component associated with a single respective input signal, and at a third instant in time, the signal output from the signal combiner 130 might comprise no components. In a first non-limiting exemplary scenario, the signal combiner 130 may receive a first signal that is based on the first baseband signal (e.g., associated with a first communication protocol). Also, the signal combiner 130 may receive a second signal that is based on the second baseband signal (e.g., associated with a second communication protocol). In such a scenario, the signal combiner 130 may combine the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the first baseband signal and a second signal component based on the second baseband signal. In such a scenario, for example where the frequency spectra of the first and second baseband signals do not overlap, the first and second baseband signals might not be spectrally shifted prior to combining by the signal combiner 130. In such a scenario, the spectral placement module 110 (and optionally, the second spectral placement module 120) may receive a control signal indicating whether or not to perform spectral shifting and/or to what degree spectral shifting should be implemented.

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	See, e.g., Rofougaran at 4:16-67. Various components of the exemplary communication system 100 (and other communication systems illustrated and discussed herein) may be implemented in analog and/or digital circuitry. To illustrate this, the exemplary communication system 100 is not shown with analog-to-digital converters (ADCs) or digital-to-analog converters (DACs). FIGS. 4-6, to be discussed later, show various non-limiting exemplary configurations including such converters. FIG. 2 is a diagram showing a portion of a second non-limiting exemplary communication system 200, in accordance with various aspects of the present invention. The communication system 200 may, for example and without limitation, share any or all characteristics with the communication system 100 illustrated in FIG. 1 and discussed previously. The exemplary communication system 200 may comprise at least a first input 201 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to the Bluetooth communication protocol. FIG. 2 shows an exemplary frequency spectrum 203 associated with the first baseband signal. The exemplary communication system 200 may also comprise at least a second input 202 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first communication protocol discussed above). For example and without limitation, the first baseband signal may correspond to an IEEE 802.11 communication protocol (e.g., IEEE 802.11(b) or IEEE 802.11(g)). FIG. 2 shows an exemplary frequency spectrum 204 associated with the second baseband signal. *See, e.g.*, Rofougaran at 5:64-6:31.

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	In a non-limiting exemplary configuration illustrated in FIG. 2, the signal combiner 230 receives a first signal from the spectral placement module 210 that is based on the spectrally shifted first baseband signal. Also, the signal combiner 230 receives a second signal that is based on the second baseband signal. In such a configuration, the signal combiner 230 combines the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the spectrally shifted first baseband signal and a second signal component based on the second baseband signal (e.g., not spectrally shifted). FIG. 2 shows an exemplary frequency spectrum 231 associated with the composite signal formed by the signal combiner 230. The spectrum 231 comprises a first portion 233 corresponding to the first signal component, and a second portion 232 corresponding to the second signal component. Note that the first portion 233 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 232. The exemplary communication system 200 may also comprise an upconverter 240 adapted to upconvert a signal (e.g., the composite signal from the signal combiner 230) for transmission. The upconverter 240 may, for example and without limitation, share any or all characteristics with the upconverter 140 discussed previously. The upconverter 240 may, for example, comprise a mixer 247, a local oscillator 246 and one or more filters 248. The mixer 247 may, for example, receive the composite signal from the signal combiner 230 and an RF mixing signal at frequency fRF from a local oscillator 246. The upconverter 240 may, for example, filter the upconverted signal from the mixer 247 with one or more filters 248. The output of the upconverter 240 may, for example, comprise a signal indicative of the composite signal spectrally shifted to an RF frequency. FIG. 2 shows an exemplary frequency spectrum 241 associated with the RF signal formed by the upconverter 240. The frequency spectrum 241 comprises a first portion 243 corresponding to the first signal component and a second portion 242 corresponding to the second signal component. Note that the first portion 243 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 242. Also note that the first portion 243 and

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	second portion 242 might be formed with a first mirror portion 244 and second mirror portion 245, respectively. Note that a mirror portion may either be removed or may be kept for later processing. The exemplary communication system 200 may further comprise a RF transmission stage 250 adapted to transmit an RF signal. The RF transmission stage 250 may, for example and without limitation, share any or all characteristics with the RF transmission stage 150 discussed previously. Such an RF signal may, for example, be associated with the composite signal output from the signal combiner 230 and upconverted by the upconverter 240. The RF transmission stage 250 may, for example and without limitation, comprise a power amplifier 252, antenna 254 and other components generally associated with RF signal transmission. *See, e.g.*, Rofougaran at 6:66-7:57. For example, the spectral placement module 510, optional second spectral placement module 520 and signal combiner 530 may operate in the analog domain. The first digital-to-analog converter 592 may convert the first baseband signal to the analog domain for processing by the spectral placement module 510. The second digital-to-analog converter 594 may convert the second baseband signal to the analog domain for processing by the second spectral placement module 520 or signal combiner 530. The signal combiner 530 then combines signals in the analog domain to generate an analog composite signal, which is then upconverted and transmitted by the upconverter 540 and RF transmission stage 550, respectively. *See, e.g.*, Rofougaran at 9:30-41. FIG. 7 is a diagram showing a portion of a seventh non-limiting exemplary communication system 700, in accordance with various aspects of the present invention. The exemplary communication system 700 may, for example and without limitation, share any or all characteristics with the exemplary systems 100-600 illustrated in FIGS. 1-6 and discussed previously. The exemplary communication system 700 may comprise a first mixer 744 that receives a spectrally shifted first baseband signal from the spectral placement module 710 and a first RF mixing signal (e.g., a 2.446 GHz signal generally associated with the Bluetooth communication protocol) from a

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	first local oscillator 742. The exemplary communication system 700 may also comprise a second mixer 748 that receives a second baseband signal (or a spectrally shifted second baseband signal) and a second RF mixing signal (e.g., a 2.486 GHz signal generally associated with the IEEE 802.11(g) communication protocol) from a second local oscillator 746. The exemplary communication system 700 may comprise an RF signal combiner 730 that is adapted to combine input RF signals. The RF signal combiner 730 may, for example, receive and combine the output signals from the first mixer 744 and second mixer 748 to generate an RF composite signal. The exemplary communication system 700 may also comprise a RF transmission stage 750 that receives the RF composite signal from the RF signal combiner 730 and transmit the signal. *See, e.g.*, Rofougaran at 10:18-43. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 810 comprises receiving the first baseband signal, step 810 may comprise receiving the first baseband signal in any manner generally associated with receiving a baseband signal. The first baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 810 may, for example, comprise generating the first baseband signal independently (e.g., corresponding to an independent communication). Step 810 may alternatively, for example, comprise generating the first baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first baseband signal and other baseband signals for a single communication). The exemplary method 800 may, at step 820, comprise spectrally placing (or shifting) the first baseband signal (e.g., received at step 810). Step 820 may, for example and without limitation, share any or all functional characteristics with the spectral placement modules 110-710 of the exemplary systems 100-700 illustrated in FIGS. 1-7 and discussed previously.

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	Step 820 may, for example, comprise spectrally shifting the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with a second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, step 820 may comprise implementing a frequency-hopping scheme with the first baseband signal. For example, in a scenario where there are one or more frequency bands (e.g., a second frequency space) associated with a second baseband signal, step 820 may comprise spectrally shifting the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. In another non-limiting exemplary scenario, spectrally shifting the first baseband signal may result in the production of a spectral image (e.g., frequency content mirrored about a mixing frequency utilized to spectrally shift the first baseband signal). In such a scenario, step 820 may comprise accepting or rejecting the image. In a scenario where an image is rejected, step 820 may comprise rejecting the image in any of a variety of manners. For example and without limitation, step 820 may comprise performing image reject mixing to spectrally shift the first baseband signal. Such image reject mixing generally comprises spectrally shifting a signal and rejecting an image associated with the spectrally shifted signal. Also for example, step 820 may comprise filtering out an unwanted image. The scope of various aspects of the present invention should not be limited by the utilization of image rejection or by any particular manner of performing such image rejection. The exemplary method 800 may, at step 830, comprise generating and/or receiving a second baseband signal corresponding to a second communication protocol (e.g., different from the first communication protocol). Step 830 may, for example and without limitation, share any or all functional characteristics with the second input 102 of the exemplary system 100 illustrated in FIG. 1 and discussed previously.

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	The second baseband signal may, for example, correspond to a second communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 830 comprises receiving the second baseband signal, step 830 may comprise receiving the second baseband signal in any manner generally associated with receiving a baseband signal. The second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 830 may, for example, comprise generating the second baseband signal independently (e.g., corresponding to a communication independent of a communication associated with the first baseband signal). Step 830 may alternatively, for example, comprise generating the second baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the second baseband signal and the first baseband signal for a single communication). *See*, *e.g.*, Rofougaran at 11:53-13:4. Furthermore, this claim element is obvious in light of Rofougaran itself, when combined with any of the other references as charted for this claim element in Exs. A-1–A-31, First Supplemental Ex. A-Obviousness Chart, and/or when combined with the knowledge of one of ordinary skill in the art. Motivations to combine may come from the knowledge of the person of ordinary skill themselves, or from the known problems and predictable solutions as embodied in these references. Further motivations to combine references and additional details may be found in the Cover Pleading and First Supplemental Ex. A-Obviousness Chart.
[14.5] down-converting the amplified received up-converted signal using a first down-converter and a signal corresponding to the first RF center frequency to produce a fourth analog signal	Rofougaran discloses “down-converting the amplified received up-converted signal using a first down-converter and a signal corresponding to the first RF center frequency to produce a fourth analog signal corresponding to the first analog signal.” See, e.g.:

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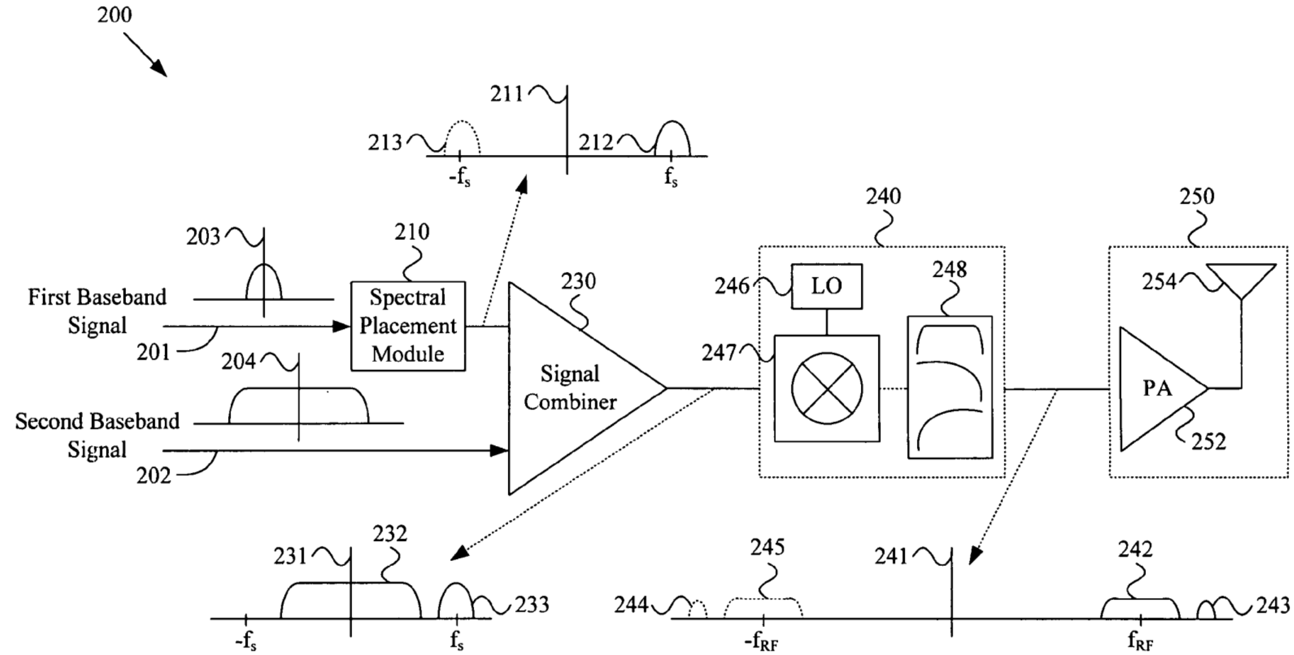
corresponding to the first analog signal; and	 Figure 2 *See, e.g.*, Rofougaran at Figure 2.

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	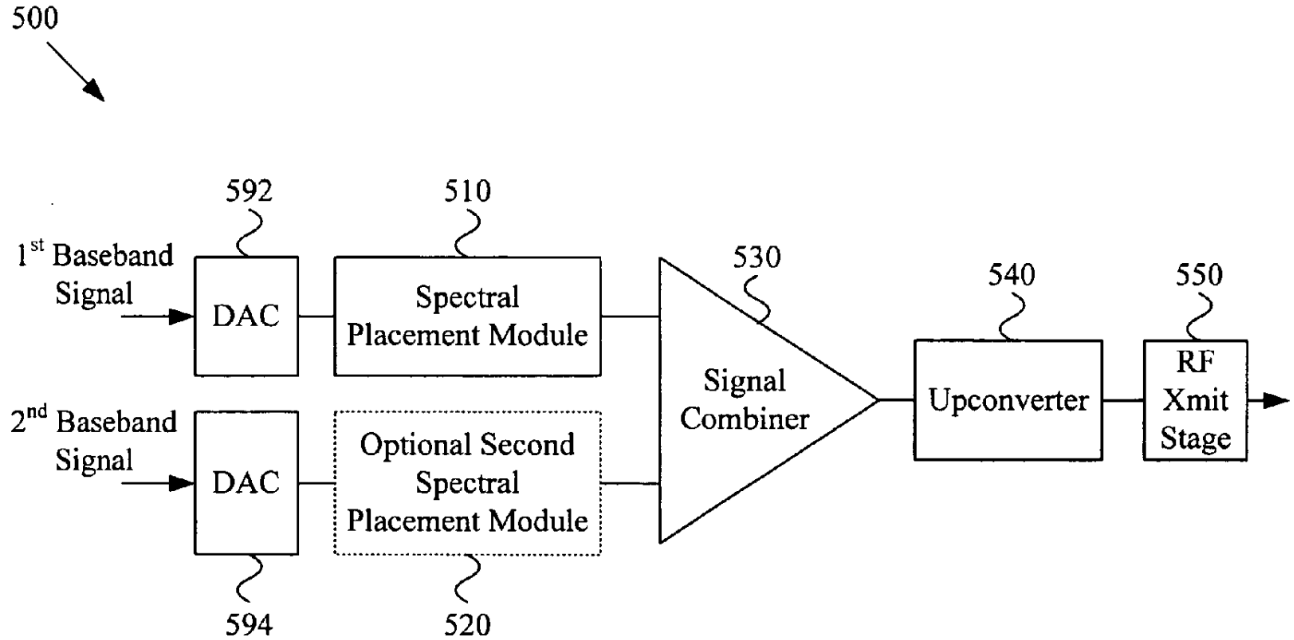 Figure 5 *See, e.g.*, Rofougaran at Figure 5.

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	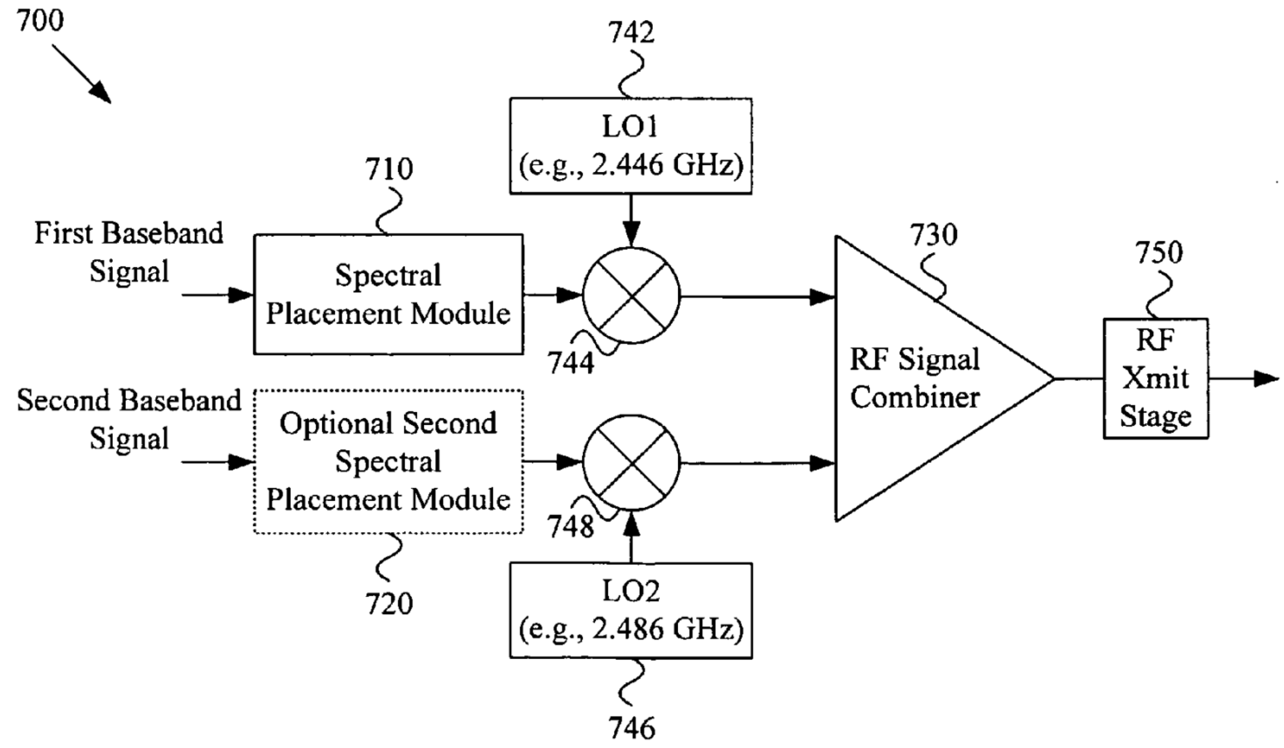 Figure 7 *See, e.g.*, Rofougaran at Figure 7. FIG. 1 is a diagram showing a portion of a first non-limiting exemplary communication system 100, in accordance with various aspects of the present invention. The communication system (or device) may comprise characteristics of any of a variety of communication systems/devices (e.g., multimode wireless communication devices). For example and without limitation, the communication system may comprise characteristics of any of a variety of mobile wireless communication devices (e.g.,

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	cellular phones, paging devices, portable email devices, etc.). Also for example, the communication system may comprise characteristics of fixed communication systems or devices (e.g., network access points, base stations, satellites, wireless routers, set top boxes, etc.). Further for example, the communication system may comprise characteristics of a variety of electronic devices with wireless communication capability (e.g., televisions, music players, cameras, remote controls, personal digital assistants, handheld computers, gaming devices, etc.). Accordingly, the scope of various aspects of the present invention should not be limited by characteristics of particular communication systems or devices. The following discussion will, at times, refer to various communication modes. A multimode communication device may, for example, be adapted to communicate in a plurality of such communication modes. For the following discussion, a communication mode may generally be considered to coincide with communication utilizing a particular communication protocol or standard. A non-limiting list of exemplary communication protocols includes various cellular communication protocols (e.g., GSM, GPRS, EDGE, CDMA, WCDMA, TDMA, PDC, etc.), various wireless networking protocols or standards, including WLAN, WMAN, WPAN and WWAN (e.g., IEEE 802.11, Bluetooth, IEEE 802.15, UWB, IEEE 802.16, IEEE 802.20, Zigbee, any WiFi protocol, etc.), various television communication standards, etc. The scope of various aspects of the present invention should not be limited by characteristics of particular communication modes or protocols, whether standard or proprietary. The exemplary communication system 100 may comprise at least a first input 101 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to any of the previously mentioned communication protocols. The exemplary communication system 100 may also comprise at least a second input 102 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first

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	communication protocol discussed above). For example and without limitation, the second baseband signal may correspond to any of the previously mentioned communication protocols. The first baseband signal and the second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of the communication system 100. For example, such modules may generate the first and second baseband signals independently (e.g., corresponding to independent respective communications). Alternatively, for example, such modules may generate the first and second baseband signals in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first and second baseband signals for a single communication). The exemplary communication system 100 may additionally comprise a spectral placement module 110 that is adapted to spectrally shift the first baseband signal (i.e., shift the frequency spectrum of the first baseband signal). In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to spectrally shift the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with the second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to implement a frequency-hopping scheme with the first baseband signal. For example, in a scenario, where there are one or more frequency bands (e.g., a second frequency space) associated with the second baseband signal, the spectral placement module 110 may be adapted to shift the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. *See, e.g.*, Rofougaran at 2:38-3:58. The exemplary communication system 100 may also comprise a second spectral placement module 120. Such a second spectral placement module 120 may, for example, share any or all characteristics

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	with the spectral placement module 110 discussed previously. The incorporation of such a second spectral placement module 120 may, for example, provide spectral shifting flexibility. For example, in such an exemplary configuration, either or both of the first and second baseband signals may be spectrally shifted to substantially distinct frequency spaces. Also for example, in such an exemplary configuration, either or both of the first and second baseband signals may be frequency hopped. Note that though the second spectral placement module 120 is illustrated separate from the first spectral placement module 110, the second spectral placement module 120 may share any or all hardware and/or software components with the spectral placement module 110. The exemplary communication system 100 may further comprise a signal combiner 130 that is adapted to generate a composite signal comprising various input signals to the signal combiner 130. For example, the composite signal may simultaneously (i.e., at an instant in time) comprise components associated with various input signals. Note that such simultaneity need not always be present. For example, at a first instant in time, the signal output from the signal combiner 130 might comprise a plurality of components associated with a plurality of respective input signals, at a second instant in time, the signal output from the signal combiner 130 might comprise a single component associated with a single respective input signal, and at a third instant in time, the signal output from the signal combiner 130 might comprise no components. In a first non-limiting exemplary scenario, the signal combiner 130 may receive a first signal that is based on the first baseband signal (e.g., associated with a first communication protocol). Also, the signal combiner 130 may receive a second signal that is based on the second baseband signal (e.g., associated with a second communication protocol). In such a scenario, the signal combiner 130 may combine the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the first baseband signal and a second signal component based on the second baseband signal. In such a scenario, for example where the frequency spectra of the first and second baseband signals do not overlap, the first and second baseband signals might not be spectrally shifted prior to combining by the signal combiner 130. In such a scenario, the spectral placement module 110 (and optionally, the second spectral placement module 120) may receive a control signal indicating whether or not to perform spectral shifting and/or to what degree spectral shifting should be implemented.

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	See, e.g., Rofougaran at 4:16-67. Various components of the exemplary communication system 100 (and other communication systems illustrated and discussed herein) may be implemented in analog and/or digital circuitry. To illustrate this, the exemplary communication system 100 is not shown with analog-to-digital converters (ADCs) or digital-to-analog converters (DACs). FIGS. 4-6, to be discussed later, show various non-limiting exemplary configurations including such converters. FIG. 2 is a diagram showing a portion of a second non-limiting exemplary communication system 200, in accordance with various aspects of the present invention. The communication system 200 may, for example and without limitation, share any or all characteristics with the communication system 100 illustrated in FIG. 1 and discussed previously. The exemplary communication system 200 may comprise at least a first input 201 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to the Bluetooth communication protocol. FIG. 2 shows an exemplary frequency spectrum 203 associated with the first baseband signal. The exemplary communication system 200 may also comprise at least a second input 202 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first communication protocol discussed above). For example and without limitation, the first baseband signal may correspond to an IEEE 802.11 communication protocol (e.g., IEEE 802.11(b) or IEEE 802.11(g)). FIG. 2 shows an exemplary frequency spectrum 204 associated with the second baseband signal. *See, e.g.*, Rofougaran at 5:64-6:31.

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	In a non-limiting exemplary configuration illustrated in FIG. 2, the signal combiner 230 receives a first signal from the spectral placement module 210 that is based on the spectrally shifted first baseband signal. Also, the signal combiner 230 receives a second signal that is based on the second baseband signal. In such a configuration, the signal combiner 230 combines the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the spectrally shifted first baseband signal and a second signal component based on the second baseband signal (e.g., not spectrally shifted). FIG. 2 shows an exemplary frequency spectrum 231 associated with the composite signal formed by the signal combiner 230. The spectrum 231 comprises a first portion 233 corresponding to the first signal component, and a second portion 232 corresponding to the second signal component. Note that the first portion 233 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 232. The exemplary communication system 200 may also comprise an upconverter 240 adapted to upconvert a signal (e.g., the composite signal from the signal combiner 230) for transmission. The upconverter 240 may, for example and without limitation, share any or all characteristics with the upconverter 140 discussed previously. The upconverter 240 may, for example, comprise a mixer 247, a local oscillator 246 and one or more filters 248. The mixer 247 may, for example, receive the composite signal from the signal combiner 230 and an RF mixing signal at frequency fRF from a local oscillator 246. The upconverter 240 may, for example, filter the upconverted signal from the mixer 247 with one or more filters 248. The output of the upconverter 240 may, for example, comprise a signal indicative of the composite signal spectrally shifted to an RF frequency. FIG. 2 shows an exemplary frequency spectrum 241 associated with the RF signal formed by the upconverter 240. The frequency spectrum 241 comprises a first portion 243 corresponding to the first signal component and a second portion 242 corresponding to the second signal component. Note that the first portion 243 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 242. Also note that the first portion 243 and

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	second portion 242 might be formed with a first mirror portion 244 and second mirror portion 245, respectively. Note that a mirror portion may either be removed or may be kept for later processing. The exemplary communication system 200 may further comprise a RF transmission stage 250 adapted to transmit an RF signal. The RF transmission stage 250 may, for example and without limitation, share any or all characteristics with the RF transmission stage 150 discussed previously. Such an RF signal may, for example, be associated with the composite signal output from the signal combiner 230 and upconverted by the upconverter 240. The RF transmission stage 250 may, for example and without limitation, comprise a power amplifier 252, antenna 254 and other components generally associated with RF signal transmission. *See, e.g.*, Rofougaran at 6:66-7:57. For example, the spectral placement module 510, optional second spectral placement module 520 and signal combiner 530 may operate in the analog domain. The first digital-to-analog converter 592 may convert the first baseband signal to the analog domain for processing by the spectral placement module 510. The second digital-to-analog converter 594 may convert the second baseband signal to the analog domain for processing by the second spectral placement module 520 or signal combiner 530. The signal combiner 530 then combines signals in the analog domain to generate an analog composite signal, which is then upconverted and transmitted by the upconverter 540 and RF transmission stage 550, respectively. *See, e.g.*, Rofougaran at 9:30-41. FIG. 7 is a diagram showing a portion of a seventh non-limiting exemplary communication system 700, in accordance with various aspects of the present invention. The exemplary communication system 700 may, for example and without limitation, share any or all characteristics with the exemplary systems 100-600 illustrated in FIGS. 1-6 and discussed previously. The exemplary communication system 700 may comprise a first mixer 744 that receives a spectrally shifted first baseband signal from the spectral placement module 710 and a first RF mixing signal (e.g., a 2.446 GHz signal generally associated with the Bluetooth communication protocol) from a

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	first local oscillator 742. The exemplary communication system 700 may also comprise a second mixer 748 that receives a second baseband signal (or a spectrally shifted second baseband signal) and a second RF mixing signal (e.g., a 2.486 GHz signal generally associated with the IEEE 802.11(g) communication protocol) from a second local oscillator 746. The exemplary communication system 700 may comprise an RF signal combiner 730 that is adapted to combine input RF signals. The RF signal combiner 730 may, for example, receive and combine the output signals from the first mixer 744 and second mixer 748 to generate an RF composite signal. The exemplary communication system 700 may also comprise a RF transmission stage 750 that receives the RF composite signal from the RF signal combiner 730 and transmit the signal. *See, e.g.*, Rofougaran at 10:18-43. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 810 comprises receiving the first baseband signal, step 810 may comprise receiving the first baseband signal in any manner generally associated with receiving a baseband signal. The first baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 810 may, for example, comprise generating the first baseband signal independently (e.g., corresponding to an independent communication). Step 810 may alternatively, for example, comprise generating the first baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first baseband signal and other baseband signals for a single communication). The exemplary method 800 may, at step 820, comprise spectrally placing (or shifting) the first baseband signal (e.g., received at step 810). Step 820 may, for example and without limitation, share any or all functional characteristics with the spectral placement modules 110-710 of the exemplary systems 100-700 illustrated in FIGS. 1-7 and discussed previously.

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	Step 820 may, for example, comprise spectrally shifting the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with a second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, step 820 may comprise implementing a frequency-hopping scheme with the first baseband signal. For example, in a scenario where there are one or more frequency bands (e.g., a second frequency space) associated with a second baseband signal, step 820 may comprise spectrally shifting the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. In another non-limiting exemplary scenario, spectrally shifting the first baseband signal may result in the production of a spectral image (e.g., frequency content mirrored about a mixing frequency utilized to spectrally shift the first baseband signal). In such a scenario, step 820 may comprise accepting or rejecting the image. In a scenario where an image is rejected, step 820 may comprise rejecting the image in any of a variety of manners. For example and without limitation, step 820 may comprise performing image reject mixing to spectrally shift the first baseband signal. Such image reject mixing generally comprises spectrally shifting a signal and rejecting an image associated with the spectrally shifted signal. Also for example, step 820 may comprise filtering out an unwanted image. The scope of various aspects of the present invention should not be limited by the utilization of image rejection or by any particular manner of performing such image rejection. The exemplary method 800 may, at step 830, comprise generating and/or receiving a second baseband signal corresponding to a second communication protocol (e.g., different from the first communication protocol). Step 830 may, for example and without limitation, share any or all functional characteristics with the second input 102 of the exemplary system 100 illustrated in FIG. 1 and discussed previously.

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	The second baseband signal may, for example, correspond to a second communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 830 comprises receiving the second baseband signal, step 830 may comprise receiving the second baseband signal in any manner generally associated with receiving a baseband signal. The second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 830 may, for example, comprise generating the second baseband signal independently (e.g., corresponding to a communication independent of a communication associated with the first baseband signal). Step 830 may alternatively, for example, comprise generating the second baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the second baseband signal and the first baseband signal for a single communication). *See, e.g.*, Rofougaran at 11:53-13:4. Furthermore, this claim element is obvious in light of Rofougaran itself, when combined with any of the other references as charted for this claim element in Exs. A-1–A-31, First Supplemental Ex. A-Obviousness Chart, and/or when combined with the knowledge of one of ordinary skill in the art. Motivations to combine may come from the knowledge of the person of ordinary skill themselves, or from the known problems and predictable solutions as embodied in these references. Further motivations to combine references and additional details may be found in the Cover Pleading and First Supplemental Ex. A-Obviousness Chart.
[14.6] down-converting the amplified received up-converted analog signal using a second down-converter and a signal corresponding to the second RF center frequency to produce a fifth analog signal	Rofougaran discloses “down-converting the amplified received up-converted analog signal using a second down-converter and a signal corresponding to the second RF center frequency to produce a fifth analog signal corresponding to the second analog signal.” See, e.g.:

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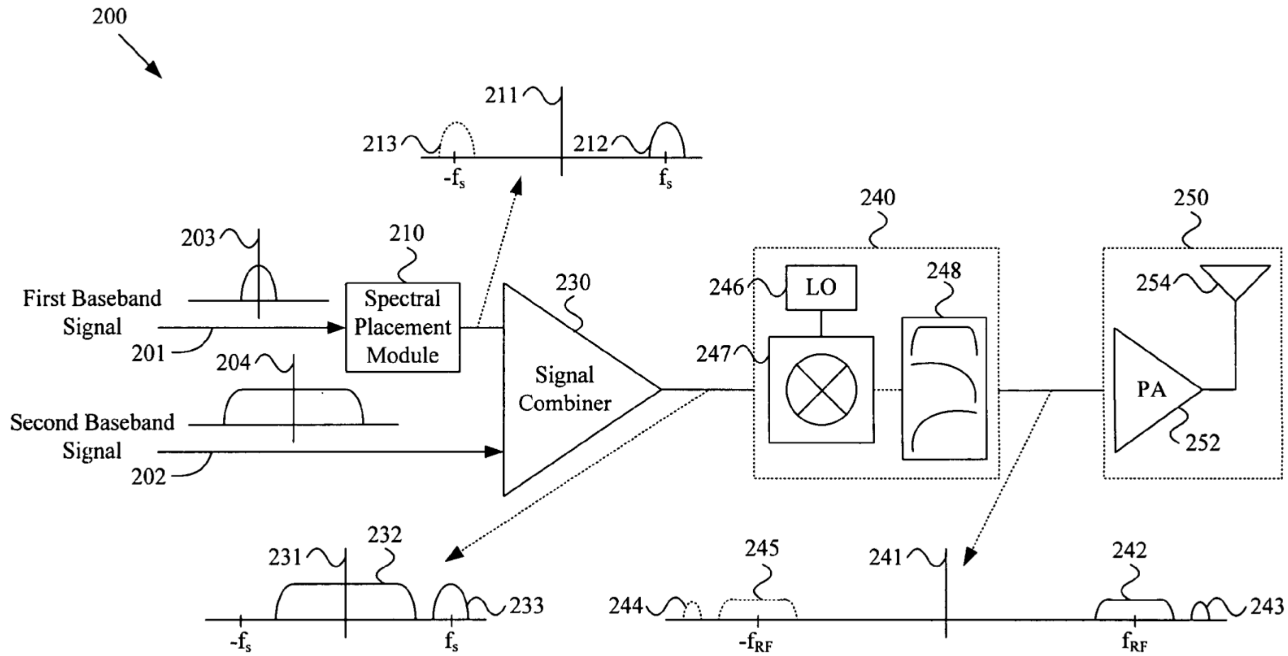
corresponding to the second analog signal.	 Figure 2 *See, e.g.*, Rofougaran at Figure 2.

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	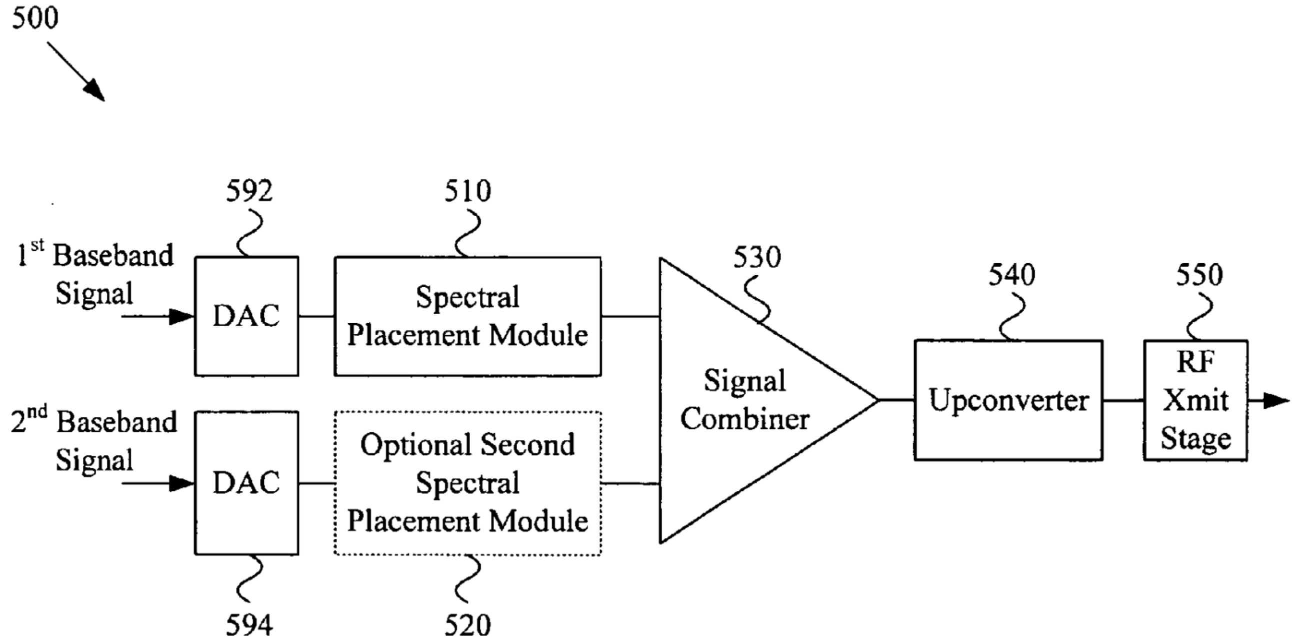 Figure 5 *See, e.g.*, Rofougaran at Figure 5.

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	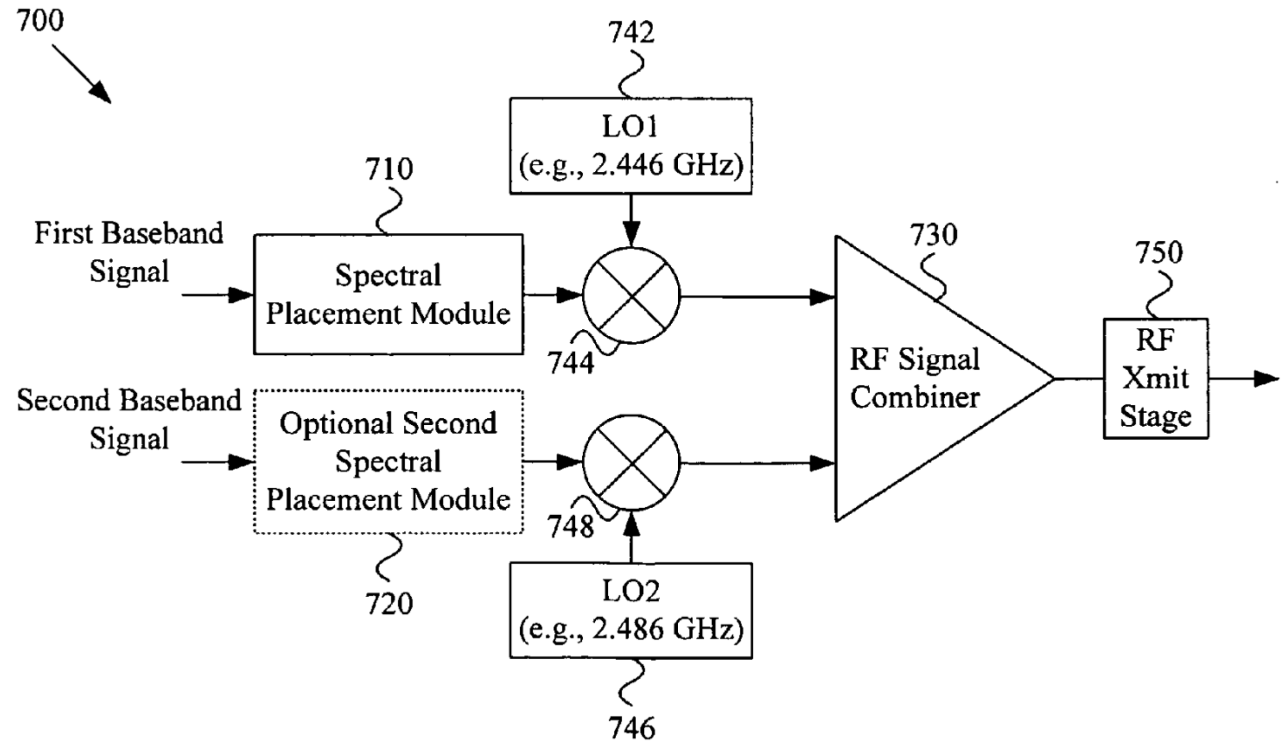 Figure 7 *See, e.g.*, Rofougaran at Figure 7. FIG. 1 is a diagram showing a portion of a first non-limiting exemplary communication system 100, in accordance with various aspects of the present invention. The communication system (or device) may comprise characteristics of any of a variety of communication systems/devices (e.g., multimode wireless communication devices). For example and without limitation, the communication system may comprise characteristics of any of a variety of mobile wireless communication devices (e.g.,

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	cellular phones, paging devices, portable email devices, etc.). Also for example, the communication system may comprise characteristics of fixed communication systems or devices (e.g., network access points, base stations, satellites, wireless routers, set top boxes, etc.). Further for example, the communication system may comprise characteristics of a variety of electronic devices with wireless communication capability (e.g., televisions, music players, cameras, remote controls, personal digital assistants, handheld computers, gaming devices, etc.). Accordingly, the scope of various aspects of the present invention should not be limited by characteristics of particular communication systems or devices. The following discussion will, at times, refer to various communication modes. A multimode communication device may, for example, be adapted to communicate in a plurality of such communication modes. For the following discussion, a communication mode may generally be considered to coincide with communication utilizing a particular communication protocol or standard. A non-limiting list of exemplary communication protocols includes various cellular communication protocols (e.g., GSM, GPRS, EDGE, CDMA, WCDMA, TDMA, PDC, etc.), various wireless networking protocols or standards, including WLAN, WMAN, WPAN and WWAN (e.g., IEEE 802.11, Bluetooth, IEEE 802.15, UWB, IEEE 802.16, IEEE 802.20, Zigbee, any WiFi protocol, etc.), various television communication standards, etc. The scope of various aspects of the present invention should not be limited by characteristics of particular communication modes or protocols, whether standard or proprietary. The exemplary communication system 100 may comprise at least a first input 101 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to any of the previously mentioned communication protocols. The exemplary communication system 100 may also comprise at least a second input 102 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first

Claim 14 of the ’802 Patent	Prior Art Reference – Rofougaran
	communication protocol discussed above). For example and without limitation, the second baseband signal may correspond to any of the previously mentioned communication protocols. The first baseband signal and the second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of the communication system 100. For example, such modules may generate the first and second baseband signals independently (e.g., corresponding to independent respective communications). Alternatively, for example, such modules may generate the first and second baseband signals in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first and second baseband signals for a single communication). The exemplary communication system 100 may additionally comprise a spectral placement module 110 that is adapted to spectrally shift the first baseband signal (i.e., shift the frequency spectrum of the first baseband signal). In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to spectrally shift the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with the second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to implement a frequency-hopping scheme with the first baseband signal. For example, in a scenario, where there are one or more frequency bands (e.g., a second frequency space) associated with the second baseband signal, the spectral placement module 110 may be adapted to shift the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. *See, e.g.*, Rofougaran at 2:38-3:58. The exemplary communication system 100 may also comprise a second spectral placement module 120. Such a second spectral placement module 120 may, for example, share any or all characteristics

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	with the spectral placement module 110 discussed previously. The incorporation of such a second spectral placement module 120 may, for example, provide spectral shifting flexibility. For example, in such an exemplary configuration, either or both of the first and second baseband signals may be spectrally shifted to substantially distinct frequency spaces. Also for example, in such an exemplary configuration, either or both of the first and second baseband signals may be frequency hopped. Note that though the second spectral placement module 120 is illustrated separate from the first spectral placement module 110, the second spectral placement module 120 may share any or all hardware and/or software components with the spectral placement module 110. The exemplary communication system 100 may further comprise a signal combiner 130 that is adapted to generate a composite signal comprising various input signals to the signal combiner 130. For example, the composite signal may simultaneously (i.e., at an instant in time) comprise components associated with various input signals. Note that such simultaneity need not always be present. For example, at a first instant in time, the signal output from the signal combiner 130 might comprise a plurality of components associated with a plurality of respective input signals, at a second instant in time, the signal output from the signal combiner 130 might comprise a single component associated with a single respective input signal, and at a third instant in time, the signal output from the signal combiner 130 might comprise no components. In a first non-limiting exemplary scenario, the signal combiner 130 may receive a first signal that is based on the first baseband signal (e.g., associated with a first communication protocol). Also, the signal combiner 130 may receive a second signal that is based on the second baseband signal (e.g., associated with a second communication protocol). In such a scenario, the signal combiner 130 may combine the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the first baseband signal and a second signal component based on the second baseband signal. In such a scenario, for example where the frequency spectra of the first and second baseband signals do not overlap, the first and second baseband signals might not be spectrally shifted prior to combining by the signal combiner 130. In such a scenario, the spectral placement module 110 (and optionally, the second spectral placement module 120) may receive a control signal indicating whether or not to perform spectral shifting and/or to what degree spectral shifting should be implemented.

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	See, e.g., Rofougaran at 4:16-67. Various components of the exemplary communication system 100 (and other communication systems illustrated and discussed herein) may be implemented in analog and/or digital circuitry. To illustrate this, the exemplary communication system 100 is not shown with analog-to-digital converters (ADCs) or digital-to-analog converters (DACs). FIGS. 4-6, to be discussed later, show various non-limiting exemplary configurations including such converters. FIG. 2 is a diagram showing a portion of a second non-limiting exemplary communication system 200, in accordance with various aspects of the present invention. The communication system 200 may, for example and without limitation, share any or all characteristics with the communication system 100 illustrated in FIG. 1 and discussed previously. The exemplary communication system 200 may comprise at least a first input 201 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to the Bluetooth communication protocol. FIG. 2 shows an exemplary frequency spectrum 203 associated with the first baseband signal. The exemplary communication system 200 may also comprise at least a second input 202 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first communication protocol discussed above). For example and without limitation, the first baseband signal may correspond to an IEEE 802.11 communication protocol (e.g., IEEE 802.11(b) or IEEE 802.11(g)). FIG. 2 shows an exemplary frequency spectrum 204 associated with the second baseband signal. *See, e.g.*, Rofougaran at 5:64-6:31.

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	In a non-limiting exemplary configuration illustrated in FIG. 2, the signal combiner 230 receives a first signal from the spectral placement module 210 that is based on the spectrally shifted first baseband signal. Also, the signal combiner 230 receives a second signal that is based on the second baseband signal. In such a configuration, the signal combiner 230 combines the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the spectrally shifted first baseband signal and a second signal component based on the second baseband signal (e.g., not spectrally shifted). FIG. 2 shows an exemplary frequency spectrum 231 associated with the composite signal formed by the signal combiner 230. The spectrum 231 comprises a first portion 233 corresponding to the first signal component, and a second portion 232 corresponding to the second signal component. Note that the first portion 233 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 232. The exemplary communication system 200 may also comprise an upconverter 240 adapted to upconvert a signal (e.g., the composite signal from the signal combiner 230) for transmission. The upconverter 240 may, for example and without limitation, share any or all characteristics with the upconverter 140 discussed previously. The upconverter 240 may, for example, comprise a mixer 247, a local oscillator 246 and one or more filters 248. The mixer 247 may, for example, receive the composite signal from the signal combiner 230 and an RF mixing signal at frequency fRF from a local oscillator 246. The upconverter 240 may, for example, filter the upconverted signal from the mixer 247 with one or more filters 248. The output of the upconverter 240 may, for example, comprise a signal indicative of the composite signal spectrally shifted to an RF frequency. FIG. 2 shows an exemplary frequency spectrum 241 associated with the RF signal formed by the upconverter 240. The frequency spectrum 241 comprises a first portion 243 corresponding to the first signal component and a second portion 242 corresponding to the second signal component. Note that the first portion 243 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 242. Also note that the first portion 243 and

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	second portion 242 might be formed with a first mirror portion 244 and second mirror portion 245, respectively. Note that a mirror portion may either be removed or may be kept for later processing. The exemplary communication system 200 may further comprise a RF transmission stage 250 adapted to transmit an RF signal. The RF transmission stage 250 may, for example and without limitation, share any or all characteristics with the RF transmission stage 150 discussed previously. Such an RF signal may, for example, be associated with the composite signal output from the signal combiner 230 and upconverted by the upconverter 240. The RF transmission stage 250 may, for example and without limitation, comprise a power amplifier 252, antenna 254 and other components generally associated with RF signal transmission. *See, e.g.*, Rofougaran at 6:66-7:57. For example, the spectral placement module 510, optional second spectral placement module 520 and signal combiner 530 may operate in the analog domain. The first digital-to-analog converter 592 may convert the first baseband signal to the analog domain for processing by the spectral placement module 510. The second digital-to-analog converter 594 may convert the second baseband signal to the analog domain for processing by the second spectral placement module 520 or signal combiner 530. The signal combiner 530 then combines signals in the analog domain to generate an analog composite signal, which is then upconverted and transmitted by the upconverter 540 and RF transmission stage 550, respectively. *See, e.g.*, Rofougaran at 9:30-41. FIG. 7 is a diagram showing a portion of a seventh non-limiting exemplary communication system 700, in accordance with various aspects of the present invention. The exemplary communication system 700 may, for example and without limitation, share any or all characteristics with the exemplary systems 100-600 illustrated in FIGS. 1-6 and discussed previously. The exemplary communication system 700 may comprise a first mixer 744 that receives a spectrally shifted first baseband signal from the spectral placement module 710 and a first RF mixing signal (e.g., a 2.446 GHz signal generally associated with the Bluetooth communication protocol) from a

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	first local oscillator 742. The exemplary communication system 700 may also comprise a second mixer 748 that receives a second baseband signal (or a spectrally shifted second baseband signal) and a second RF mixing signal (e.g., a 2.486 GHz signal generally associated with the IEEE 802.11(g) communication protocol) from a second local oscillator 746. The exemplary communication system 700 may comprise an RF signal combiner 730 that is adapted to combine input RF signals. The RF signal combiner 730 may, for example, receive and combine the output signals from the first mixer 744 and second mixer 748 to generate an RF composite signal. The exemplary communication system 700 may also comprise a RF transmission stage 750 that receives the RF composite signal from the RF signal combiner 730 and transmit the signal. *See, e.g.*, Rofougaran at 10:18-43. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 810 comprises receiving the first baseband signal, step 810 may comprise receiving the first baseband signal in any manner generally associated with receiving a baseband signal. The first baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 810 may, for example, comprise generating the first baseband signal independently (e.g., corresponding to an independent communication). Step 810 may alternatively, for example, comprise generating the first baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first baseband signal and other baseband signals for a single communication). The exemplary method 800 may, at step 820, comprise spectrally placing (or shifting) the first baseband signal (e.g., received at step 810). Step 820 may, for example and without limitation, share any or all functional characteristics with the spectral placement modules 110-710 of the exemplary systems 100-700 illustrated in FIGS. 1-7 and discussed previously.

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	Step 820 may, for example, comprise spectrally shifting the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with a second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, step 820 may comprise implementing a frequency-hopping scheme with the first baseband signal. For example, in a scenario where there are one or more frequency bands (e.g., a second frequency space) associated with a second baseband signal, step 820 may comprise spectrally shifting the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. In another non-limiting exemplary scenario, spectrally shifting the first baseband signal may result in the production of a spectral image (e.g., frequency content mirrored about a mixing frequency utilized to spectrally shift the first baseband signal). In such a scenario, step 820 may comprise accepting or rejecting the image. In a scenario where an image is rejected, step 820 may comprise rejecting the image in any of a variety of manners. For example and without limitation, step 820 may comprise performing image reject mixing to spectrally shift the first baseband signal. Such image reject mixing generally comprises spectrally shifting a signal and rejecting an image associated with the spectrally shifted signal. Also for example, step 820 may comprise filtering out an unwanted image. The scope of various aspects of the present invention should not be limited by the utilization of image rejection or by any particular manner of performing such image rejection. The exemplary method 800 may, at step 830, comprise generating and/or receiving a second baseband signal corresponding to a second communication protocol (e.g., different from the first communication protocol). Step 830 may, for example and without limitation, share any or all functional characteristics with the second input 102 of the exemplary system 100 illustrated in FIG. 1 and discussed previously.

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	The second baseband signal may, for example, correspond to a second communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 830 comprises receiving the second baseband signal, step 830 may comprise receiving the second baseband signal in any manner generally associated with receiving a baseband signal. The second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 830 may, for example, comprise generating the second baseband signal independently (e.g., corresponding to a communication independent of a communication associated with the first baseband signal). Step 830 may alternatively, for example, comprise generating the second baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the second baseband signal and the first baseband signal for a single communication). *See, e.g.*, Rofougaran at 11:53-13:4. Furthermore, this claim element is obvious in light of Rofougaran itself, when combined with any of the other references as charted for this claim element in Exs. A-1–A-31, First Supplemental Ex. A-Obviousness Chart, and/or when combined with the knowledge of one of ordinary skill in the art. Motivations to combine may come from the knowledge of the person of ordinary skill themselves, or from the known problems and predictable solutions as embodied in these references. Further motivations to combine references and additional details may be found in the Cover Pleading and First Supplemental Ex. A-Obviousness Chart.

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[17.1] A wireless communication system comprising:	To the extent the preamble is limiting, Rofougaran discloses "A wireless communication system comprising." See, e.g.:

Claim 17 of the '802 Patent	Prior Art Reference – Rofougaran
	FIG. 1 is a diagram showing a portion of a first non-limiting exemplary communication system 100, in accordance with various aspects of the present invention. The communication system (or device) may comprise characteristics of any of a variety of communication systems/devices (e.g., multimode wireless communication devices). For example and without limitation, the communication system may comprise characteristics of any of a variety of mobile wireless communication devices (e.g., cellular phones, paging devices, portable email devices, etc.). Also for example, the communication system may comprise characteristics of fixed communication systems or devices (e.g., network access points, base stations, satellites, wireless routers, set top boxes, etc.). Further for example, the communication system may comprise characteristics of a variety of electronic devices with wireless communication capability (e.g., televisions, music players, cameras, remote controls, personal digital assistants, handheld computers, gaming devices, etc.). Accordingly, the scope of various aspects of the present invention should not be limited by characteristics of particular communication systems or devices. The following discussion will, at times, refer to various communication modes. A multimode communication device may, for example, be adapted to communicate in a plurality of such communication modes. For the following discussion, a communication mode may generally be considered to coincide with communication utilizing a particular communication protocol or standard. A non-limiting list of exemplary communication protocols includes various cellular communication protocols (e.g., GSM, GPRS, EDGE, CDMA, WCDMA, TDMA, PDC, etc.), various wireless networking protocols or standards, including WLAN, WMAN, WPAN and WWAN (e.g., IEEE 802.11, Bluetooth, IEEE 802.15, UWB, IEEE 802.16, IEEE 802.20, Zigbee, any WiFi protocol, etc.), various television communication standards, etc. The scope of various aspects of the present invention should not be limited by characteristics of particular communication modes or protocols, whether standard or proprietary. *See, e.g.*, Rofougaran at 2:36-3:6. Furthermore, this claim element is obvious in light of Rofougaran itself, when combined with any of the other references as charted for this claim element in Exs. A-1–A-31, First Supplemental Ex. A-Obviousness Chart, and/or when combined with the knowledge of one of ordinary skill in the art.

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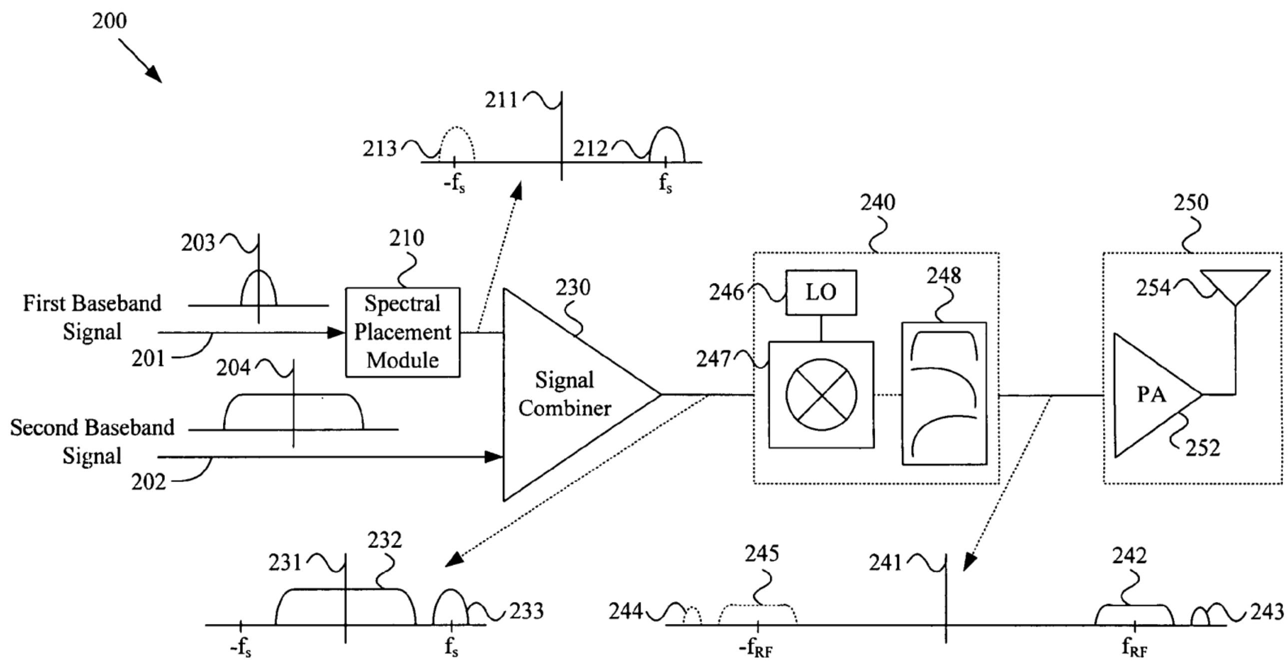
	Motivations to combine may come from the knowledge of the person of ordinary skill themselves, or from the known problems and predictable solutions as embodied in these references. Further motivations to combine references and additional details may be found in the Cover Pleading and First Supplemental Ex. A-Obviousness Chart.
[17.2] a baseband digital system for providing a first digital signal comprising a first data to be transmitted and a second digital signal comprising a second data to be transmitted;	Rofougaran discloses "a baseband digital system for providing a first digital signal comprising a first data to be transmitted and a second digital signal comprising a second data to be transmitted." See, e.g.:  Figure 2 *See, e.g.*, Rofougaran at Figure 2.

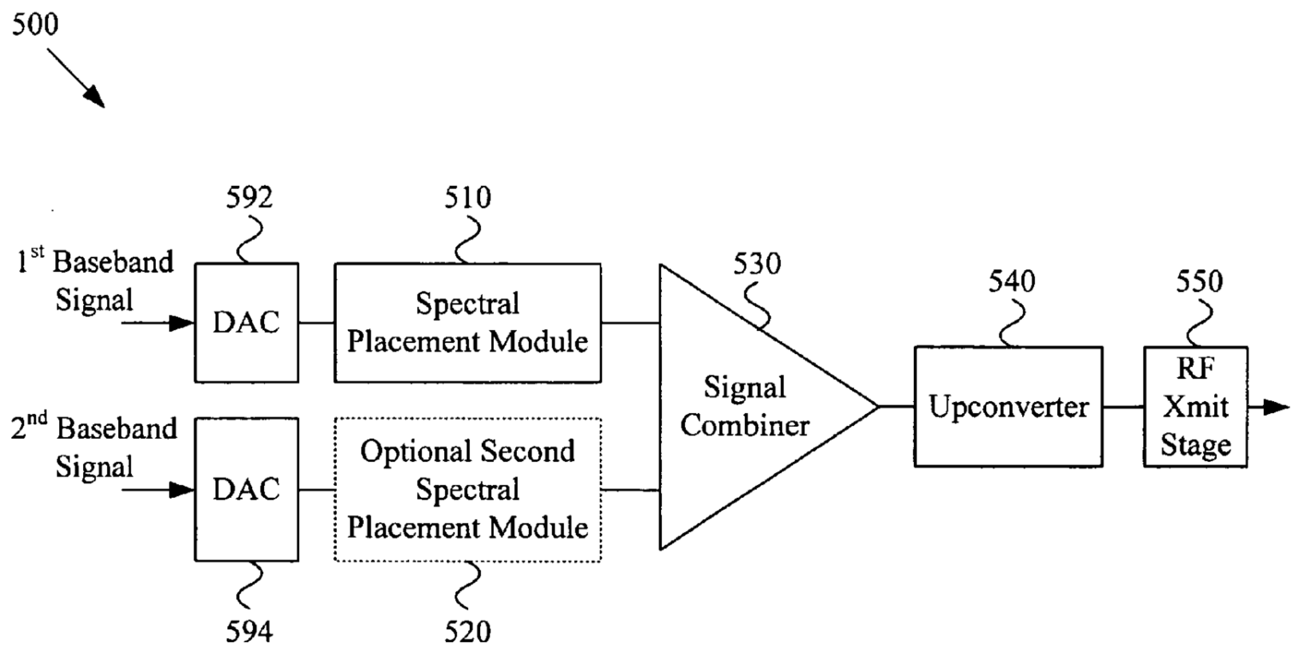
<table>
<tr><th>Claim 17 of the ’802 Patent</th><th>Prior Art Reference – Rofougaran</th></tr>
<tr><td></td><td>

Figure 5

See, e.g., Rofougaran at Figure 5.</td></tr>
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	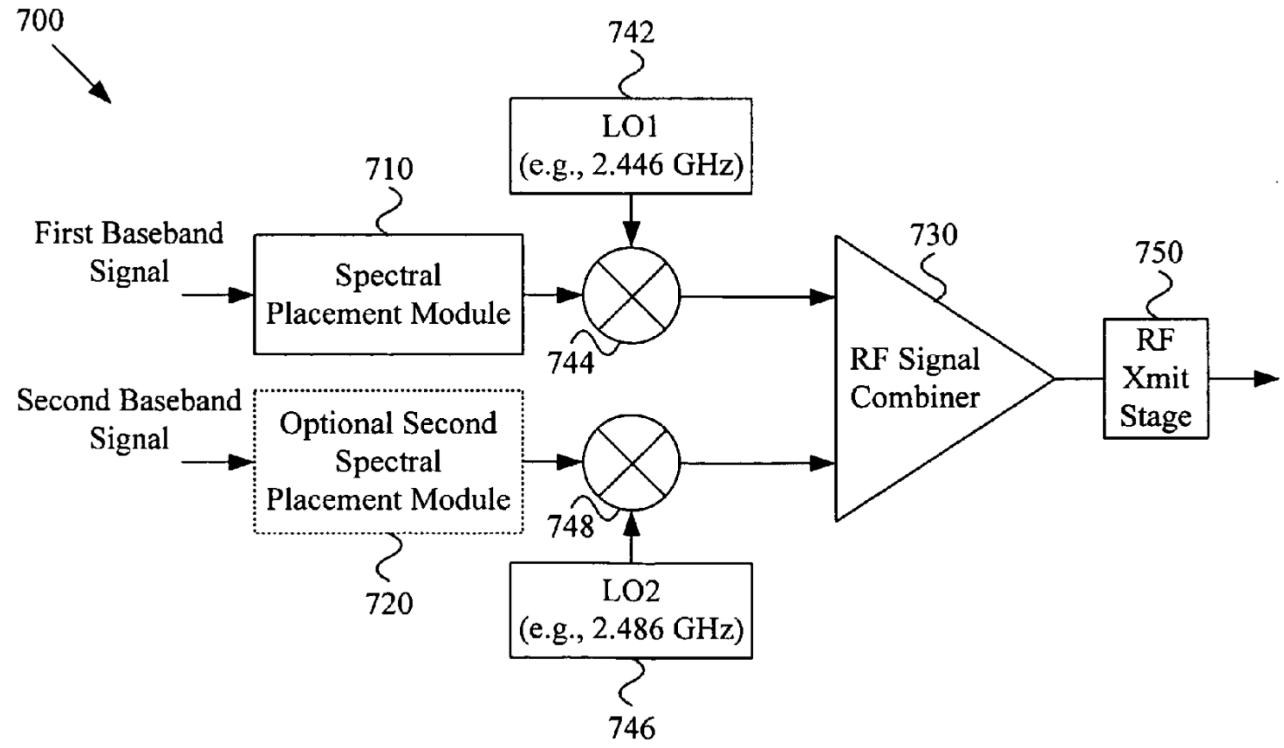 Figure 7 *See, e.g.*, Rofougaran at Figure 7. FIG. 1 is a diagram showing a portion of a first non-limiting exemplary communication system 100, in accordance with various aspects of the present invention. The communication system (or device) may comprise characteristics of any of a variety of communication systems/devices (e.g., multimode wireless communication devices). For example and without limitation, the communication system may comprise characteristics of any of a variety of mobile wireless communication devices (e.g.,

Claim 17 of the ’802 Patent	Prior Art Reference – Rofougaran
	cellular phones, paging devices, portable email devices, etc.). Also for example, the communication system may comprise characteristics of fixed communication systems or devices (e.g., network access points, base stations, satellites, wireless routers, set top boxes, etc.). Further for example, the communication system may comprise characteristics of a variety of electronic devices with wireless communication capability (e.g., televisions, music players, cameras, remote controls, personal digital assistants, handheld computers, gaming devices, etc.). Accordingly, the scope of various aspects of the present invention should not be limited by characteristics of particular communication systems or devices. The following discussion will, at times, refer to various communication modes. A multimode communication device may, for example, be adapted to communicate in a plurality of such communication modes. For the following discussion, a communication mode may generally be considered to coincide with communication utilizing a particular communication protocol or standard. A non-limiting list of exemplary communication protocols includes various cellular communication protocols (e.g., GSM, GPRS, EDGE, CDMA, WCDMA, TDMA, PDC, etc.), various wireless networking protocols or standards, including WLAN, WMAN, WPAN and WWAN (e.g., IEEE 802.11, Bluetooth, IEEE 802.15, UWB, IEEE 802.16, IEEE 802.20, Zigbee, any WiFi protocol, etc.), various television communication standards, etc. The scope of various aspects of the present invention should not be limited by characteristics of particular communication modes or protocols, whether standard or proprietary. The exemplary communication system 100 may comprise at least a first input 101 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to any of the previously mentioned communication protocols. The exemplary communication system 100 may also comprise at least a second input 102 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first

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	communication protocol discussed above). For example and without limitation, the second baseband signal may correspond to any of the previously mentioned communication protocols. The first baseband signal and the second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of the communication system 100. For example, such modules may generate the first and second baseband signals independently (e.g., corresponding to independent respective communications). Alternatively, for example, such modules may generate the first and second baseband signals in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first and second baseband signals for a single communication). The exemplary communication system 100 may additionally comprise a spectral placement module 110 that is adapted to spectrally shift the first baseband signal (i.e., shift the frequency spectrum of the first baseband signal). In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to spectrally shift the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with the second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to implement a frequency-hopping scheme with the first baseband signal. For example, in a scenario, where there are one or more frequency bands (e.g., a second frequency space) associated with the second baseband signal, the spectral placement module 110 may be adapted to shift the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. *See, e.g.*, Rofougaran at 2:38-3:58. The exemplary communication system 100 may also comprise a second spectral placement module 120. Such a second spectral placement module 120 may, for example, share any or all characteristics

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	with the spectral placement module 110 discussed previously. The incorporation of such a second spectral placement module 120 may, for example, provide spectral shifting flexibility. For example, in such an exemplary configuration, either or both of the first and second baseband signals may be spectrally shifted to substantially distinct frequency spaces. Also for example, in such an exemplary configuration, either or both of the first and second baseband signals may be frequency hopped. Note that though the second spectral placement module 120 is illustrated separate from the first spectral placement module 110, the second spectral placement module 120 may share any or all hardware and/or software components with the spectral placement module 110. The exemplary communication system 100 may further comprise a signal combiner 130 that is adapted to generate a composite signal comprising various input signals to the signal combiner 130. For example, the composite signal may simultaneously (i.e., at an instant in time) comprise components associated with various input signals. Note that such simultaneity need not always be present. For example, at a first instant in time, the signal output from the signal combiner 130 might comprise a plurality of components associated with a plurality of respective input signals, at a second instant in time, the signal output from the signal combiner 130 might comprise a single component associated with a single respective input signal, and at a third instant in time, the signal output from the signal combiner 130 might comprise no components. In a first non-limiting exemplary scenario, the signal combiner 130 may receive a first signal that is based on the first baseband signal (e.g., associated with a first communication protocol). Also, the signal combiner 130 may receive a second signal that is based on the second baseband signal (e.g., associated with a second communication protocol). In such a scenario, the signal combiner 130 may combine the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the first baseband signal and a second signal component based on the second baseband signal. In such a scenario, for example where the frequency spectra of the first and second baseband signals do not overlap, the first and second baseband signals might not be spectrally shifted prior to combining by the signal combiner 130. In such a scenario, the spectral placement module 110 (and optionally, the second spectral placement module 120) may receive a control signal indicating whether or not to perform spectral shifting and/or to what degree spectral shifting should be implemented.

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	See, e.g., Rofougaran at 4:16-67. Various components of the exemplary communication system 100 (and other communication systems illustrated and discussed herein) may be implemented in analog and/or digital circuitry. To illustrate this, the exemplary communication system 100 is not shown with analog-to-digital converters (ADCs) or digital-to-analog converters (DACs). FIGS. 4-6, to be discussed later, show various non-limiting exemplary configurations including such converters. FIG. 2 is a diagram showing a portion of a second non-limiting exemplary communication system 200, in accordance with various aspects of the present invention. The communication system 200 may, for example and without limitation, share any or all characteristics with the communication system 100 illustrated in FIG. 1 and discussed previously. The exemplary communication system 200 may comprise at least a first input 201 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to the Bluetooth communication protocol. FIG. 2 shows an exemplary frequency spectrum 203 associated with the first baseband signal. The exemplary communication system 200 may also comprise at least a second input 202 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first communication protocol discussed above). For example and without limitation, the first baseband signal may correspond to an IEEE 802.11 communication protocol (e.g., IEEE 802.11(b) or IEEE 802.11(g)). FIG. 2 shows an exemplary frequency spectrum 204 associated with the second baseband signal. *See, e.g.*, Rofougaran at 5:64-6:31.

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	In a non-limiting exemplary configuration illustrated in FIG. 2, the signal combiner 230 receives a first signal from the spectral placement module 210 that is based on the spectrally shifted first baseband signal. Also, the signal combiner 230 receives a second signal that is based on the second baseband signal. In such a configuration, the signal combiner 230 combines the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the spectrally shifted first baseband signal and a second signal component based on the second baseband signal (e.g., not spectrally shifted). FIG. 2 shows an exemplary frequency spectrum 231 associated with the composite signal formed by the signal combiner 230. The spectrum 231 comprises a first portion 233 corresponding to the first signal component, and a second portion 232 corresponding to the second signal component. Note that the first portion 233 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 232. The exemplary communication system 200 may also comprise an upconverter 240 adapted to upconvert a signal (e.g., the composite signal from the signal combiner 230) for transmission. The upconverter 240 may, for example and without limitation, share any or all characteristics with the upconverter 140 discussed previously. The upconverter 240 may, for example, comprise a mixer 247, a local oscillator 246 and one or more filters 248. The mixer 247 may, for example, receive the composite signal from the signal combiner 230 and an RF mixing signal at frequency fRF from a local oscillator 246. The upconverter 240 may, for example, filter the upconverted signal from the mixer 247 with one or more filters 248. The output of the upconverter 240 may, for example, comprise a signal indicative of the composite signal spectrally shifted to an RF frequency. FIG. 2 shows an exemplary frequency spectrum 241 associated with the RF signal formed by the upconverter 240. The frequency spectrum 241 comprises a first portion 243 corresponding to the first signal component and a second portion 242 corresponding to the second signal component. Note that the first portion 243 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 242. Also note that the first portion 243 and

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	second portion 242 might be formed with a first mirror portion 244 and second mirror portion 245, respectively. Note that a mirror portion may either be removed or may be kept for later processing. The exemplary communication system 200 may further comprise a RF transmission stage 250 adapted to transmit an RF signal. The RF transmission stage 250 may, for example and without limitation, share any or all characteristics with the RF transmission stage 150 discussed previously. Such an RF signal may, for example, be associated with the composite signal output from the signal combiner 230 and upconverted by the upconverter 240. The RF transmission stage 250 may, for example and without limitation, comprise a power amplifier 252, antenna 254 and other components generally associated with RF signal transmission. *See, e.g.*, Rofougaran at 6:66-7:57. For example, the spectral placement module 510, optional second spectral placement module 520 and signal combiner 530 may operate in the analog domain. The first digital-to-analog converter 592 may convert the first baseband signal to the analog domain for processing by the spectral placement module 510. The second digital-to-analog converter 594 may convert the second baseband signal to the analog domain for processing by the second spectral placement module 520 or signal combiner 530. The signal combiner 530 then combines signals in the analog domain to generate an analog composite signal, which is then upconverted and transmitted by the upconverter 540 and RF transmission stage 550, respectively. *See, e.g.*, Rofougaran at 9:30-41. FIG. 7 is a diagram showing a portion of a seventh non-limiting exemplary communication system 700, in accordance with various aspects of the present invention. The exemplary communication system 700 may, for example and without limitation, share any or all characteristics with the exemplary systems 100-600 illustrated in FIGS. 1-6 and discussed previously. The exemplary communication system 700 may comprise a first mixer 744 that receives a spectrally shifted first baseband signal from the spectral placement module 710 and a first RF mixing signal (e.g., a 2.446 GHz signal generally associated with the Bluetooth communication protocol) from a

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	first local oscillator 742. The exemplary communication system 700 may also comprise a second mixer 748 that receives a second baseband signal (or a spectrally shifted second baseband signal) and a second RF mixing signal (e.g., a 2.486 GHz signal generally associated with the IEEE 802.11(g) communication protocol) from a second local oscillator 746. The exemplary communication system 700 may comprise an RF signal combiner 730 that is adapted to combine input RF signals. The RF signal combiner 730 may, for example, receive and combine the output signals from the first mixer 744 and second mixer 748 to generate an RF composite signal. The exemplary communication system 700 may also comprise a RF transmission stage 750 that receives the RF composite signal from the RF signal combiner 730 and transmit the signal. *See, e.g.*, Rofougaran at 10:18-43. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 810 comprises receiving the first baseband signal, step 810 may comprise receiving the first baseband signal in any manner generally associated with receiving a baseband signal. The first baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 810 may, for example, comprise generating the first baseband signal independently (e.g., corresponding to an independent communication). Step 810 may alternatively, for example, comprise generating the first baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first baseband signal and other baseband signals for a single communication). The exemplary method 800 may, at step 820, comprise spectrally placing (or shifting) the first baseband signal (e.g., received at step 810). Step 820 may, for example and without limitation, share any or all functional characteristics with the spectral placement modules 110-710 of the exemplary systems 100-700 illustrated in FIGS. 1-7 and discussed previously.

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	Step 820 may, for example, comprise spectrally shifting the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with a second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, step 820 may comprise implementing a frequency-hopping scheme with the first baseband signal. For example, in a scenario where there are one or more frequency bands (e.g., a second frequency space) associated with a second baseband signal, step 820 may comprise spectrally shifting the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. In another non-limiting exemplary scenario, spectrally shifting the first baseband signal may result in the production of a spectral image (e.g., frequency content mirrored about a mixing frequency utilized to spectrally shift the first baseband signal). In such a scenario, step 820 may comprise accepting or rejecting the image. In a scenario where an image is rejected, step 820 may comprise rejecting the image in any of a variety of manners. For example and without limitation, step 820 may comprise performing image reject mixing to spectrally shift the first baseband signal. Such image reject mixing generally comprises spectrally shifting a signal and rejecting an image associated with the spectrally shifted signal. Also for example, step 820 may comprise filtering out an unwanted image. The scope of various aspects of the present invention should not be limited by the utilization of image rejection or by any particular manner of performing such image rejection. The exemplary method 800 may, at step 830, comprise generating and/or receiving a second baseband signal corresponding to a second communication protocol (e.g., different from the first communication protocol). Step 830 may, for example and without limitation, share any or all functional characteristics with the second input 102 of the exemplary system 100 illustrated in FIG. 1 and discussed previously.

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	The second baseband signal may, for example, correspond to a second communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 830 comprises receiving the second baseband signal, step 830 may comprise receiving the second baseband signal in any manner generally associated with receiving a baseband signal. The second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 830 may, for example, comprise generating the second baseband signal independently (e.g., corresponding to a communication independent of a communication associated with the first baseband signal). Step 830 may alternatively, for example, comprise generating the second baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the second baseband signal and the first baseband signal for a single communication). *See*, *e.g.*, Rofougaran at 11:53-13:4. Furthermore, this claim element is obvious in light of Rofougaran itself, when combined with any of the other references as charted for this claim element in Exs. A-1–A-31, First Supplemental Ex. A-Obviousness Chart, and/or when combined with the knowledge of one of ordinary skill in the art. Motivations to combine may come from the knowledge of the person of ordinary skill themselves, or from the known problems and predictable solutions as embodied in these references. Further motivations to combine references and additional details may be found in the Cover Pleading and First Supplemental Ex. A-Obviousness Chart.
[17.3] a first digital-to-analog converter for receiving the first digital signal and converting the first digital signal into a first analog signal, the first analog signal carrying the first data across a first frequency range;	Rofougaran discloses "a first digital-to-analog converter for receiving the first digital signal and converting the first digital signal into a first analog signal, the first analog signal carrying the first data across a first frequency range." See, e.g.:

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	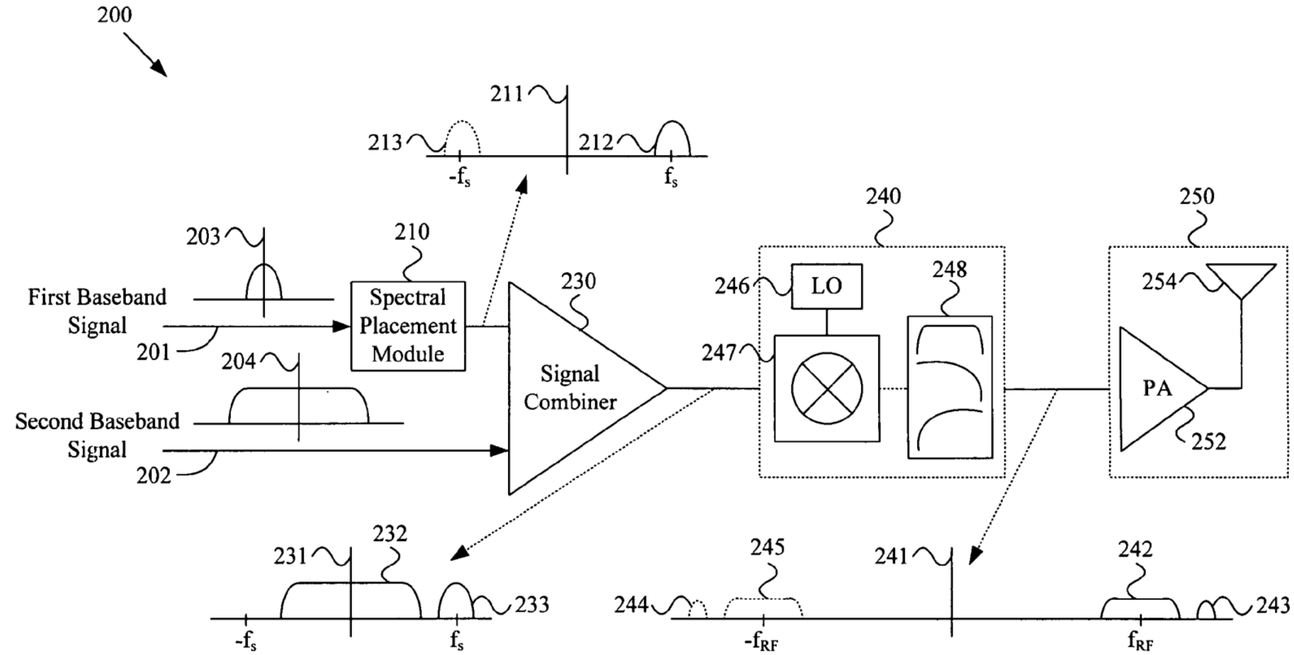 Figure 2 *See, e.g.*, Rofougaran at Figure 2.

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	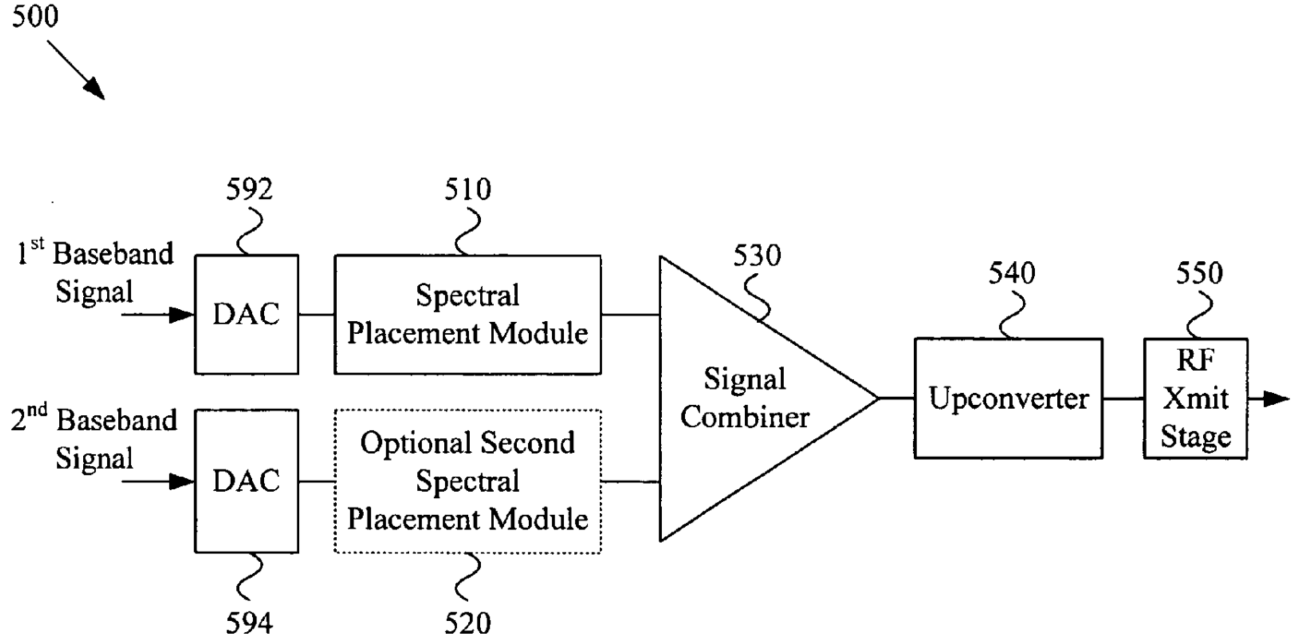 Figure 5 *See, e.g.*, Rofougaran at Figure 5.

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	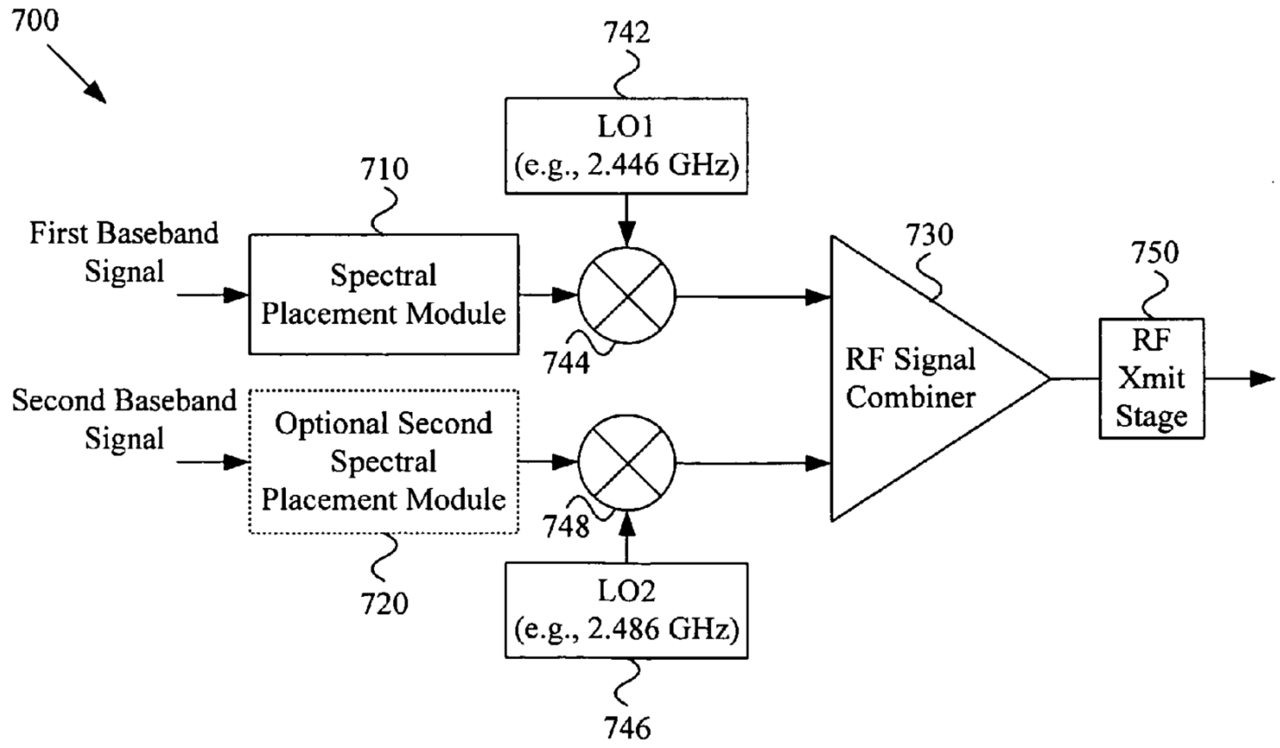 Figure 7 *See, e.g.*, Rofougaran at Figure 7. FIG. 1 is a diagram showing a portion of a first non-limiting exemplary communication system 100, in accordance with various aspects of the present invention. The communication system (or device) may comprise characteristics of any of a variety of communication systems/devices (e.g., multimode wireless communication devices). For example and without limitation, the communication system may comprise characteristics of any of a variety of mobile wireless communication devices (e.g.,

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	cellular phones, paging devices, portable email devices, etc.). Also for example, the communication system may comprise characteristics of fixed communication systems or devices (e.g., network access points, base stations, satellites, wireless routers, set top boxes, etc.). Further for example, the communication system may comprise characteristics of a variety of electronic devices with wireless communication capability (e.g., televisions, music players, cameras, remote controls, personal digital assistants, handheld computers, gaming devices, etc.). Accordingly, the scope of various aspects of the present invention should not be limited by characteristics of particular communication systems or devices. The following discussion will, at times, refer to various communication modes. A multimode communication device may, for example, be adapted to communicate in a plurality of such communication modes. For the following discussion, a communication mode may generally be considered to coincide with communication utilizing a particular communication protocol or standard. A non-limiting list of exemplary communication protocols includes various cellular communication protocols (e.g., GSM, GPRS, EDGE, CDMA, WCDMA, TDMA, PDC, etc.), various wireless networking protocols or standards, including WLAN, WMAN, WPAN and WWAN (e.g., IEEE 802.11, Bluetooth, IEEE 802.15, UWB, IEEE 802.16, IEEE 802.20, Zigbee, any WiFi protocol, etc.), various television communication standards, etc. The scope of various aspects of the present invention should not be limited by characteristics of particular communication modes or protocols, whether standard or proprietary. The exemplary communication system 100 may comprise at least a first input 101 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to any of the previously mentioned communication protocols. The exemplary communication system 100 may also comprise at least a second input 102 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first

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	communication protocol discussed above). For example and without limitation, the second baseband signal may correspond to any of the previously mentioned communication protocols. The first baseband signal and the second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of the communication system 100. For example, such modules may generate the first and second baseband signals independently (e.g., corresponding to independent respective communications). Alternatively, for example, such modules may generate the first and second baseband signals in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first and second baseband signals for a single communication). The exemplary communication system 100 may additionally comprise a spectral placement module 110 that is adapted to spectrally shift the first baseband signal (i.e., shift the frequency spectrum of the first baseband signal). In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to spectrally shift the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with the second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to implement a frequency-hopping scheme with the first baseband signal. For example, in a scenario, where there are one or more frequency bands (e.g., a second frequency space) associated with the second baseband signal, the spectral placement module 110 may be adapted to shift the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. *See, e.g.*, Rofougaran at 2:38-3:58. The exemplary communication system 100 may also comprise a second spectral placement module 120. Such a second spectral placement module 120 may, for example, share any or all characteristics

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	with the spectral placement module 110 discussed previously. The incorporation of such a second spectral placement module 120 may, for example, provide spectral shifting flexibility. For example, in such an exemplary configuration, either or both of the first and second baseband signals may be spectrally shifted to substantially distinct frequency spaces. Also for example, in such an exemplary configuration, either or both of the first and second baseband signals may be frequency hopped. Note that though the second spectral placement module 120 is illustrated separate from the first spectral placement module 110, the second spectral placement module 120 may share any or all hardware and/or software components with the spectral placement module 110. The exemplary communication system 100 may further comprise a signal combiner 130 that is adapted to generate a composite signal comprising various input signals to the signal combiner 130. For example, the composite signal may simultaneously (i.e., at an instant in time) comprise components associated with various input signals. Note that such simultaneity need not always be present. For example, at a first instant in time, the signal output from the signal combiner 130 might comprise a plurality of components associated with a plurality of respective input signals, at a second instant in time, the signal output from the signal combiner 130 might comprise a single component associated with a single respective input signal, and at a third instant in time, the signal output from the signal combiner 130 might comprise no components. In a first non-limiting exemplary scenario, the signal combiner 130 may receive a first signal that is based on the first baseband signal (e.g., associated with a first communication protocol). Also, the signal combiner 130 may receive a second signal that is based on the second baseband signal (e.g., associated with a second communication protocol). In such a scenario, the signal combiner 130 may combine the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the first baseband signal and a second signal component based on the second baseband signal. In such a scenario, for example where the frequency spectra of the first and second baseband signals do not overlap, the first and second baseband signals might not be spectrally shifted prior to combining by the signal combiner 130. In such a scenario, the spectral placement module 110 (and optionally, the second spectral placement module 120) may receive a control signal indicating whether or not to perform spectral shifting and/or to what degree spectral shifting should be implemented.

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	See, e.g., Rofougaran at 4:16-67. Various components of the exemplary communication system 100 (and other communication systems illustrated and discussed herein) may be implemented in analog and/or digital circuitry. To illustrate this, the exemplary communication system 100 is not shown with analog-to-digital converters (ADCs) or digital-to-analog converters (DACs). FIGS. 4-6, to be discussed later, show various non-limiting exemplary configurations including such converters. FIG. 2 is a diagram showing a portion of a second non-limiting exemplary communication system 200, in accordance with various aspects of the present invention. The communication system 200 may, for example and without limitation, share any or all characteristics with the communication system 100 illustrated in FIG. 1 and discussed previously. The exemplary communication system 200 may comprise at least a first input 201 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to the Bluetooth communication protocol. FIG. 2 shows an exemplary frequency spectrum 203 associated with the first baseband signal. The exemplary communication system 200 may also comprise at least a second input 202 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first communication protocol discussed above). For example and without limitation, the first baseband signal may correspond to an IEEE 802.11 communication protocol (e.g., IEEE 802.11(b) or IEEE 802.11(g)). FIG. 2 shows an exemplary frequency spectrum 204 associated with the second baseband signal. *See, e.g.*, Rofougaran at 5:64-6:31.

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	In a non-limiting exemplary configuration illustrated in FIG. 2, the signal combiner 230 receives a first signal from the spectral placement module 210 that is based on the spectrally shifted first baseband signal. Also, the signal combiner 230 receives a second signal that is based on the second baseband signal. In such a configuration, the signal combiner 230 combines the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the spectrally shifted first baseband signal and a second signal component based on the second baseband signal (e.g., not spectrally shifted). FIG. 2 shows an exemplary frequency spectrum 231 associated with the composite signal formed by the signal combiner 230. The spectrum 231 comprises a first portion 233 corresponding to the first signal component, and a second portion 232 corresponding to the second signal component. Note that the first portion 233 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 232. The exemplary communication system 200 may also comprise an upconverter 240 adapted to upconvert a signal (e.g., the composite signal from the signal combiner 230) for transmission. The upconverter 240 may, for example and without limitation, share any or all characteristics with the upconverter 140 discussed previously. The upconverter 240 may, for example, comprise a mixer 247, a local oscillator 246 and one or more filters 248. The mixer 247 may, for example, receive the composite signal from the signal combiner 230 and an RF mixing signal at frequency fRF from a local oscillator 246. The upconverter 240 may, for example, filter the upconverted signal from the mixer 247 with one or more filters 248. The output of the upconverter 240 may, for example, comprise a signal indicative of the composite signal spectrally shifted to an RF frequency. FIG. 2 shows an exemplary frequency spectrum 241 associated with the RF signal formed by the upconverter 240. The frequency spectrum 241 comprises a first portion 243 corresponding to the first signal component and a second portion 242 corresponding to the second signal component. Note that the first portion 243 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 242. Also note that the first portion 243 and

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	second portion 242 might be formed with a first mirror portion 244 and second mirror portion 245, respectively. Note that a mirror portion may either be removed or may be kept for later processing. The exemplary communication system 200 may further comprise a RF transmission stage 250 adapted to transmit an RF signal. The RF transmission stage 250 may, for example and without limitation, share any or all characteristics with the RF transmission stage 150 discussed previously. Such an RF signal may, for example, be associated with the composite signal output from the signal combiner 230 and upconverted by the upconverter 240. The RF transmission stage 250 may, for example and without limitation, comprise a power amplifier 252, antenna 254 and other components generally associated with RF signal transmission. *See, e.g.*, Rofougaran at 6:66-7:57. For example, the spectral placement module 510, optional second spectral placement module 520 and signal combiner 530 may operate in the analog domain. The first digital-to-analog converter 592 may convert the first baseband signal to the analog domain for processing by the spectral placement module 510. The second digital-to-analog converter 594 may convert the second baseband signal to the analog domain for processing by the second spectral placement module 520 or signal combiner 530. The signal combiner 530 then combines signals in the analog domain to generate an analog composite signal, which is then upconverted and transmitted by the upconverter 540 and RF transmission stage 550, respectively. *See, e.g.*, Rofougaran at 9:30-41. FIG. 7 is a diagram showing a portion of a seventh non-limiting exemplary communication system 700, in accordance with various aspects of the present invention. The exemplary communication system 700 may, for example and without limitation, share any or all characteristics with the exemplary systems 100-600 illustrated in FIGS. 1-6 and discussed previously. The exemplary communication system 700 may comprise a first mixer 744 that receives a spectrally shifted first baseband signal from the spectral placement module 710 and a first RF mixing signal (e.g., a 2.446 GHz signal generally associated with the Bluetooth communication protocol) from a

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	first local oscillator 742. The exemplary communication system 700 may also comprise a second mixer 748 that receives a second baseband signal (or a spectrally shifted second baseband signal) and a second RF mixing signal (e.g., a 2.486 GHz signal generally associated with the IEEE 802.11(g) communication protocol) from a second local oscillator 746. The exemplary communication system 700 may comprise an RF signal combiner 730 that is adapted to combine input RF signals. The RF signal combiner 730 may, for example, receive and combine the output signals from the first mixer 744 and second mixer 748 to generate an RF composite signal. The exemplary communication system 700 may also comprise a RF transmission stage 750 that receives the RF composite signal from the RF signal combiner 730 and transmit the signal. *See*, *e.g.*, Rofougaran at 10:18-43. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 810 comprises receiving the first baseband signal, step 810 may comprise receiving the first baseband signal in any manner generally associated with receiving a baseband signal. The first baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 810 may, for example, comprise generating the first baseband signal independently (e.g., corresponding to an independent communication). Step 810 may alternatively, for example, comprise generating the first baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first baseband signal and other baseband signals for a single communication). The exemplary method 800 may, at step 820, comprise spectrally placing (or shifting) the first baseband signal (e.g., received at step 810). Step 820 may, for example and without limitation, share any or all functional characteristics with the spectral placement modules 110-710 of the exemplary systems 100-700 illustrated in FIGS. 1-7 and discussed previously.

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	Step 820 may, for example, comprise spectrally shifting the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with a second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, step 820 may comprise implementing a frequency-hopping scheme with the first baseband signal. For example, in a scenario where there are one or more frequency bands (e.g., a second frequency space) associated with a second baseband signal, step 820 may comprise spectrally shifting the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. In another non-limiting exemplary scenario, spectrally shifting the first baseband signal may result in the production of a spectral image (e.g., frequency content mirrored about a mixing frequency utilized to spectrally shift the first baseband signal). In such a scenario, step 820 may comprise accepting or rejecting the image. In a scenario where an image is rejected, step 820 may comprise rejecting the image in any of a variety of manners. For example and without limitation, step 820 may comprise performing image reject mixing to spectrally shift the first baseband signal. Such image reject mixing generally comprises spectrally shifting a signal and rejecting an image associated with the spectrally shifted signal. Also for example, step 820 may comprise filtering out an unwanted image. The scope of various aspects of the present invention should not be limited by the utilization of image rejection or by any particular manner of performing such image rejection. The exemplary method 800 may, at step 830, comprise generating and/or receiving a second baseband signal corresponding to a second communication protocol (e.g., different from the first communication protocol). Step 830 may, for example and without limitation, share any or all functional characteristics with the second input 102 of the exemplary system 100 illustrated in FIG. 1 and discussed previously.

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	The second baseband signal may, for example, correspond to a second communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 830 comprises receiving the second baseband signal, step 830 may comprise receiving the second baseband signal in any manner generally associated with receiving a baseband signal. The second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 830 may, for example, comprise generating the second baseband signal independently (e.g., corresponding to a communication independent of a communication associated with the first baseband signal). Step 830 may alternatively, for example, comprise generating the second baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the second baseband signal and the first baseband signal for a single communication). *See*, *e.g.*, Rofougaran at 11:53-13:4. Furthermore, this claim element is obvious in light of Rofougaran itself, when combined with any of the other references as charted for this claim element in Exs. A-1–A-31, First Supplemental Ex. A-Obviousness Chart, and/or when combined with the knowledge of one of ordinary skill in the art. Motivations to combine may come from the knowledge of the person of ordinary skill themselves, or from the known problems and predictable solutions as embodied in these references. Further motivations to combine references and additional details may be found in the Cover Pleading and First Supplemental Ex. A-Obviousness Chart.
[17.4] a second digital-to-analog converter for receiving the second digital signal and converting the second digital signal into a second analog signal, the second analog signal carrying the second	Rofougaran discloses “a second digital-to-analog converter for receiving the second digital signal and converting the second digital signal into a second analog signal, the second analog signal carrying the second data across a second frequency range.” See, e.g.:

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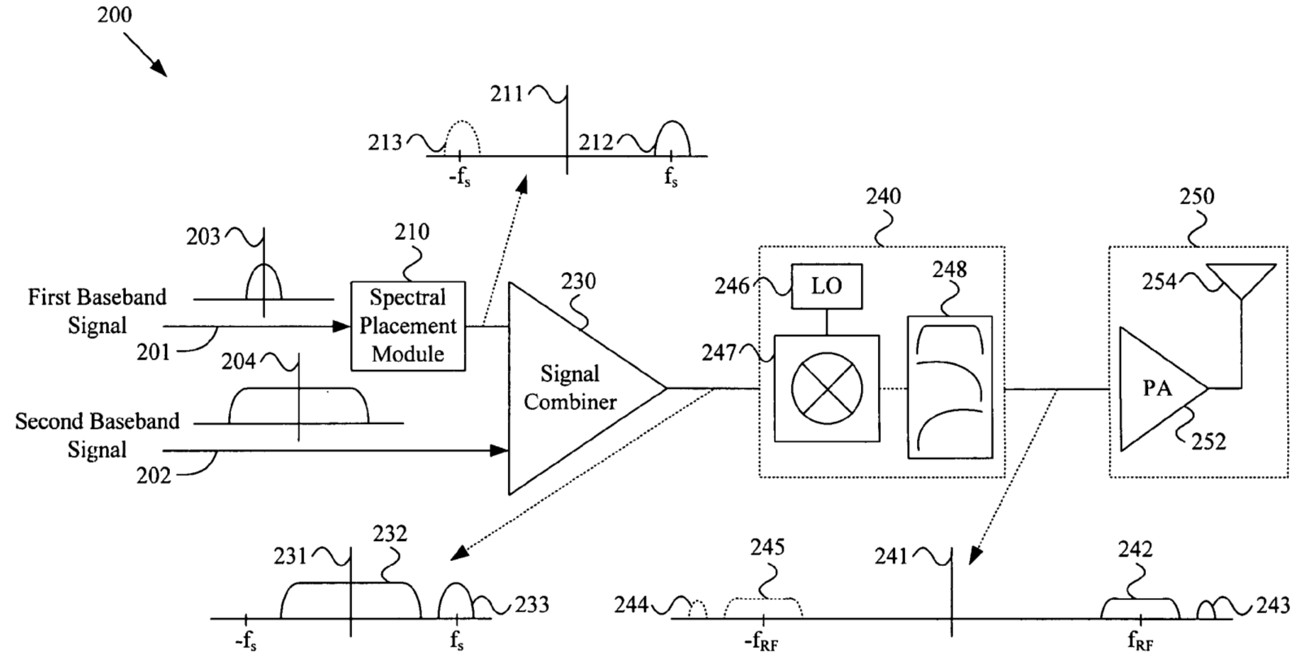
data across a second frequency range;	 Figure 2 *See, e.g.*, Rofougaran at Figure 2.

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	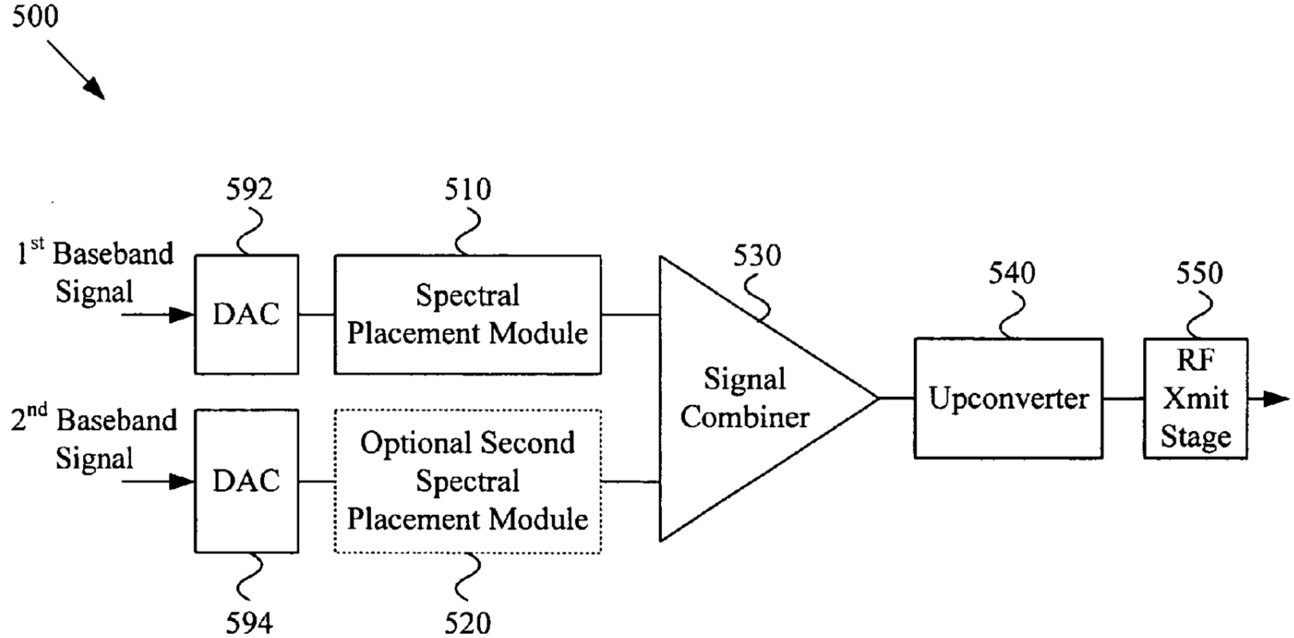 Figure 5 *See, e.g.*, Rofougaran at Figure 5.

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	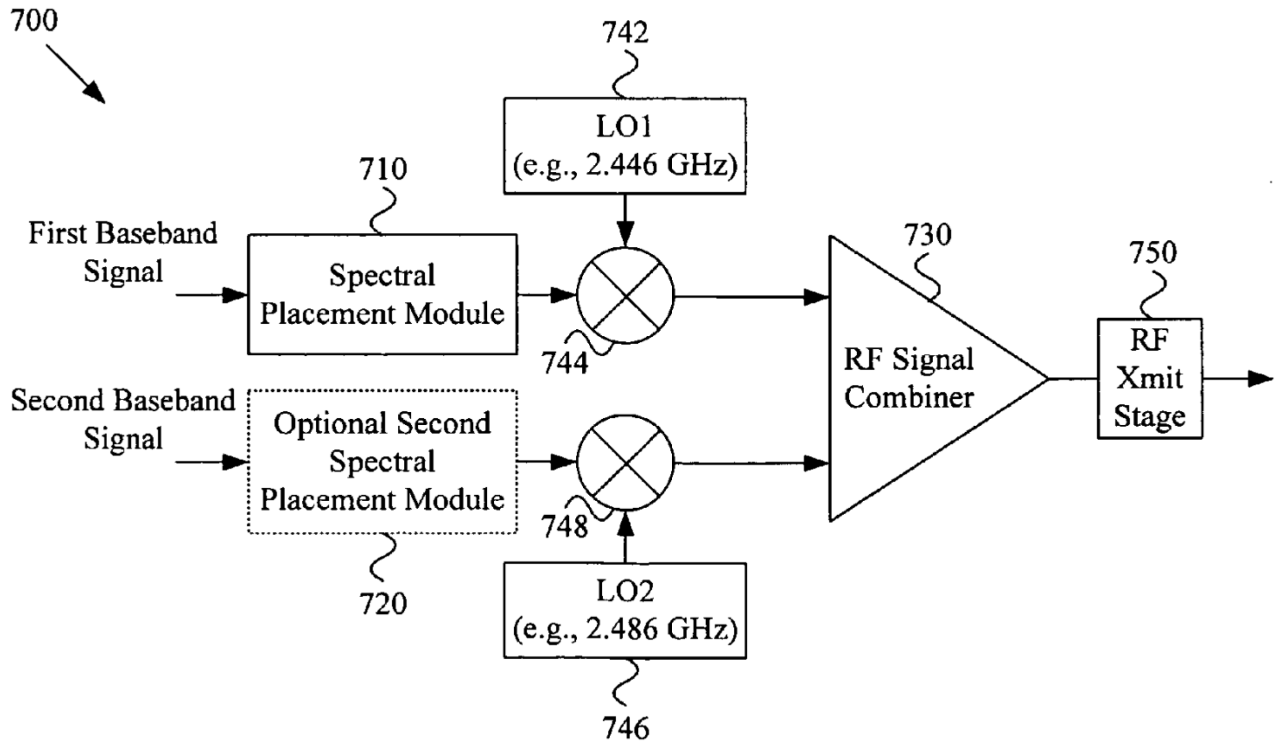 Figure 7 *See, e.g.*, Rofougaran at Figure 7. FIG. 1 is a diagram showing a portion of a first non-limiting exemplary communication system 100, in accordance with various aspects of the present invention. The communication system (or device) may comprise characteristics of any of a variety of communication systems/devices (e.g., multimode wireless communication devices). For example and without limitation, the communication system may comprise characteristics of any of a variety of mobile wireless communication devices (e.g.,

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	cellular phones, paging devices, portable email devices, etc.). Also for example, the communication system may comprise characteristics of fixed communication systems or devices (e.g., network access points, base stations, satellites, wireless routers, set top boxes, etc.). Further for example, the communication system may comprise characteristics of a variety of electronic devices with wireless communication capability (e.g., televisions, music players, cameras, remote controls, personal digital assistants, handheld computers, gaming devices, etc.). Accordingly, the scope of various aspects of the present invention should not be limited by characteristics of particular communication systems or devices. The following discussion will, at times, refer to various communication modes. A multimode communication device may, for example, be adapted to communicate in a plurality of such communication modes. For the following discussion, a communication mode may generally be considered to coincide with communication utilizing a particular communication protocol or standard. A non-limiting list of exemplary communication protocols includes various cellular communication protocols (e.g., GSM, GPRS, EDGE, CDMA, WCDMA, TDMA, PDC, etc.), various wireless networking protocols or standards, including WLAN, WMAN, WPAN and WWAN (e.g., IEEE 802.11, Bluetooth, IEEE 802.15, UWB, IEEE 802.16, IEEE 802.20, Zigbee, any WiFi protocol, etc.), various television communication standards, etc. The scope of various aspects of the present invention should not be limited by characteristics of particular communication modes or protocols, whether standard or proprietary. The exemplary communication system 100 may comprise at least a first input 101 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to any of the previously mentioned communication protocols. The exemplary communication system 100 may also comprise at least a second input 102 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first

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	communication protocol discussed above). For example and without limitation, the second baseband signal may correspond to any of the previously mentioned communication protocols. The first baseband signal and the second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of the communication system 100. For example, such modules may generate the first and second baseband signals independently (e.g., corresponding to independent respective communications). Alternatively, for example, such modules may generate the first and second baseband signals in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first and second baseband signals for a single communication). The exemplary communication system 100 may additionally comprise a spectral placement module 110 that is adapted to spectrally shift the first baseband signal (i.e., shift the frequency spectrum of the first baseband signal). In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to spectrally shift the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with the second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to implement a frequency-hopping scheme with the first baseband signal. For example, in a scenario, where there are one or more frequency bands (e.g., a second frequency space) associated with the second baseband signal, the spectral placement module 110 may be adapted to shift the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. *See, e.g.*, Rofougaran at 2:38-3:58. The exemplary communication system 100 may also comprise a second spectral placement module 120. Such a second spectral placement module 120 may, for example, share any or all characteristics

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	with the spectral placement module 110 discussed previously. The incorporation of such a second spectral placement module 120 may, for example, provide spectral shifting flexibility. For example, in such an exemplary configuration, either or both of the first and second baseband signals may be spectrally shifted to substantially distinct frequency spaces. Also for example, in such an exemplary configuration, either or both of the first and second baseband signals may be frequency hopped. Note that though the second spectral placement module 120 is illustrated separate from the first spectral placement module 110, the second spectral placement module 120 may share any or all hardware and/or software components with the spectral placement module 110. The exemplary communication system 100 may further comprise a signal combiner 130 that is adapted to generate a composite signal comprising various input signals to the signal combiner 130. For example, the composite signal may simultaneously (i.e., at an instant in time) comprise components associated with various input signals. Note that such simultaneity need not always be present. For example, at a first instant in time, the signal output from the signal combiner 130 might comprise a plurality of components associated with a plurality of respective input signals, at a second instant in time, the signal output from the signal combiner 130 might comprise a single component associated with a single respective input signal, and at a third instant in time, the signal output from the signal combiner 130 might comprise no components. In a first non-limiting exemplary scenario, the signal combiner 130 may receive a first signal that is based on the first baseband signal (e.g., associated with a first communication protocol). Also, the signal combiner 130 may receive a second signal that is based on the second baseband signal (e.g., associated with a second communication protocol). In such a scenario, the signal combiner 130 may combine the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the first baseband signal and a second signal component based on the second baseband signal. In such a scenario, for example where the frequency spectra of the first and second baseband signals do not overlap, the first and second baseband signals might not be spectrally shifted prior to combining by the signal combiner 130. In such a scenario, the spectral placement module 110 (and optionally, the second spectral placement module 120) may receive a control signal indicating whether or not to perform spectral shifting and/or to what degree spectral shifting should be implemented.

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	See, e.g., Rofougaran at 4:16-67. Various components of the exemplary communication system 100 (and other communication systems illustrated and discussed herein) may be implemented in analog and/or digital circuitry. To illustrate this, the exemplary communication system 100 is not shown with analog-to-digital converters (ADCs) or digital-to-analog converters (DACs). FIGS. 4-6, to be discussed later, show various non-limiting exemplary configurations including such converters. FIG. 2 is a diagram showing a portion of a second non-limiting exemplary communication system 200, in accordance with various aspects of the present invention. The communication system 200 may, for example and without limitation, share any or all characteristics with the communication system 100 illustrated in FIG. 1 and discussed previously. The exemplary communication system 200 may comprise at least a first input 201 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to the Bluetooth communication protocol. FIG. 2 shows an exemplary frequency spectrum 203 associated with the first baseband signal. The exemplary communication system 200 may also comprise at least a second input 202 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first communication protocol discussed above). For example and without limitation, the first baseband signal may correspond to an IEEE 802.11 communication protocol (e.g., IEEE 802.11(b) or IEEE 802.11(g)). FIG. 2 shows an exemplary frequency spectrum 204 associated with the second baseband signal. *See, e.g.*, Rofougaran at 5:64-6:31.

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	In a non-limiting exemplary configuration illustrated in FIG. 2, the signal combiner 230 receives a first signal from the spectral placement module 210 that is based on the spectrally shifted first baseband signal. Also, the signal combiner 230 receives a second signal that is based on the second baseband signal. In such a configuration, the signal combiner 230 combines the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the spectrally shifted first baseband signal and a second signal component based on the second baseband signal (e.g., not spectrally shifted). FIG. 2 shows an exemplary frequency spectrum 231 associated with the composite signal formed by the signal combiner 230. The spectrum 231 comprises a first portion 233 corresponding to the first signal component, and a second portion 232 corresponding to the second signal component. Note that the first portion 233 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 232. The exemplary communication system 200 may also comprise an upconverter 240 adapted to upconvert a signal (e.g., the composite signal from the signal combiner 230) for transmission. The upconverter 240 may, for example and without limitation, share any or all characteristics with the upconverter 140 discussed previously. The upconverter 240 may, for example, comprise a mixer 247, a local oscillator 246 and one or more filters 248. The mixer 247 may, for example, receive the composite signal from the signal combiner 230 and an RF mixing signal at frequency fRF from a local oscillator 246. The upconverter 240 may, for example, filter the upconverted signal from the mixer 247 with one or more filters 248. The output of the upconverter 240 may, for example, comprise a signal indicative of the composite signal spectrally shifted to an RF frequency. FIG. 2 shows an exemplary frequency spectrum 241 associated with the RF signal formed by the upconverter 240. The frequency spectrum 241 comprises a first portion 243 corresponding to the first signal component and a second portion 242 corresponding to the second signal component. Note that the first portion 243 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 242. Also note that the first portion 243 and

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	second portion 242 might be formed with a first mirror portion 244 and second mirror portion 245, respectively. Note that a mirror portion may either be removed or may be kept for later processing. The exemplary communication system 200 may further comprise a RF transmission stage 250 adapted to transmit an RF signal. The RF transmission stage 250 may, for example and without limitation, share any or all characteristics with the RF transmission stage 150 discussed previously. Such an RF signal may, for example, be associated with the composite signal output from the signal combiner 230 and upconverted by the upconverter 240. The RF transmission stage 250 may, for example and without limitation, comprise a power amplifier 252, antenna 254 and other components generally associated with RF signal transmission. *See, e.g.*, Rofougaran at 6:66-7:57. For example, the spectral placement module 510, optional second spectral placement module 520 and signal combiner 530 may operate in the analog domain. The first digital-to-analog converter 592 may convert the first baseband signal to the analog domain for processing by the spectral placement module 510. The second digital-to-analog converter 594 may convert the second baseband signal to the analog domain for processing by the second spectral placement module 520 or signal combiner 530. The signal combiner 530 then combines signals in the analog domain to generate an analog composite signal, which is then upconverted and transmitted by the upconverter 540 and RF transmission stage 550, respectively. *See, e.g.*, Rofougaran at 9:30-41. FIG. 7 is a diagram showing a portion of a seventh non-limiting exemplary communication system 700, in accordance with various aspects of the present invention. The exemplary communication system 700 may, for example and without limitation, share any or all characteristics with the exemplary systems 100-600 illustrated in FIGS. 1-6 and discussed previously. The exemplary communication system 700 may comprise a first mixer 744 that receives a spectrally shifted first baseband signal from the spectral placement module 710 and a first RF mixing signal (e.g., a 2.446 GHz signal generally associated with the Bluetooth communication protocol) from a

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	first local oscillator 742. The exemplary communication system 700 may also comprise a second mixer 748 that receives a second baseband signal (or a spectrally shifted second baseband signal) and a second RF mixing signal (e.g., a 2.486 GHz signal generally associated with the IEEE 802.11(g) communication protocol) from a second local oscillator 746. The exemplary communication system 700 may comprise an RF signal combiner 730 that is adapted to combine input RF signals. The RF signal combiner 730 may, for example, receive and combine the output signals from the first mixer 744 and second mixer 748 to generate an RF composite signal. The exemplary communication system 700 may also comprise a RF transmission stage 750 that receives the RF composite signal from the RF signal combiner 730 and transmit the signal. *See, e.g.*, Rofougaran at 10:18-43. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 810 comprises receiving the first baseband signal, step 810 may comprise receiving the first baseband signal in any manner generally associated with receiving a baseband signal. The first baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 810 may, for example, comprise generating the first baseband signal independently (e.g., corresponding to an independent communication). Step 810 may alternatively, for example, comprise generating the first baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first baseband signal and other baseband signals for a single communication). The exemplary method 800 may, at step 820, comprise spectrally placing (or shifting) the first baseband signal (e.g., received at step 810). Step 820 may, for example and without limitation, share any or all functional characteristics with the spectral placement modules 110-710 of the exemplary systems 100-700 illustrated in FIGS. 1-7 and discussed previously.

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	Step 820 may, for example, comprise spectrally shifting the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with a second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, step 820 may comprise implementing a frequency-hopping scheme with the first baseband signal. For example, in a scenario where there are one or more frequency bands (e.g., a second frequency space) associated with a second baseband signal, step 820 may comprise spectrally shifting the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. In another non-limiting exemplary scenario, spectrally shifting the first baseband signal may result in the production of a spectral image (e.g., frequency content mirrored about a mixing frequency utilized to spectrally shift the first baseband signal). In such a scenario, step 820 may comprise accepting or rejecting the image. In a scenario where an image is rejected, step 820 may comprise rejecting the image in any of a variety of manners. For example and without limitation, step 820 may comprise performing image reject mixing to spectrally shift the first baseband signal. Such image reject mixing generally comprises spectrally shifting a signal and rejecting an image associated with the spectrally shifted signal. Also for example, step 820 may comprise filtering out an unwanted image. The scope of various aspects of the present invention should not be limited by the utilization of image rejection or by any particular manner of performing such image rejection. The exemplary method 800 may, at step 830, comprise generating and/or receiving a second baseband signal corresponding to a second communication protocol (e.g., different from the first communication protocol). Step 830 may, for example and without limitation, share any or all functional characteristics with the second input 102 of the exemplary system 100 illustrated in FIG. 1 and discussed previously.

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	The second baseband signal may, for example, correspond to a second communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 830 comprises receiving the second baseband signal, step 830 may comprise receiving the second baseband signal in any manner generally associated with receiving a baseband signal. The second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 830 may, for example, comprise generating the second baseband signal independently (e.g., corresponding to a communication independent of a communication associated with the first baseband signal). Step 830 may alternatively, for example, comprise generating the second baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the second baseband signal and the first baseband signal for a single communication). *See*, *e.g.*, Rofougaran at 11:53-13:4. Furthermore, this claim element is obvious in light of Rofougaran itself, when combined with any of the other references as charted for this claim element in Exs. A-1–A-31, First Supplemental Ex. A-Obviousness Chart, and/or when combined with the knowledge of one of ordinary skill in the art. Motivations to combine may come from the knowledge of the person of ordinary skill themselves, or from the known problems and predictable solutions as embodied in these references. Further motivations to combine references and additional details may be found in the Cover Pleading and First Supplemental Ex. A-Obviousness Chart.
[17.5] a first up-converter circuit having a first input coupled to receive the first analog signal and a second input coupled to receive a first modulation signal having a first RF frequency, wherein the first up-converter outputs	Rofougaran discloses "a first up-converter circuit having a first input coupled to receive the first analog signal and a second input coupled to receive a first modulation signal having a first RF frequency, wherein the first up-converter outputs a first up-converted analog signal comprising a first up-converted frequency range from the first RF frequency minus one-half the first frequency range to the first RF frequency plus one-half the first frequency range." See, e.g.:

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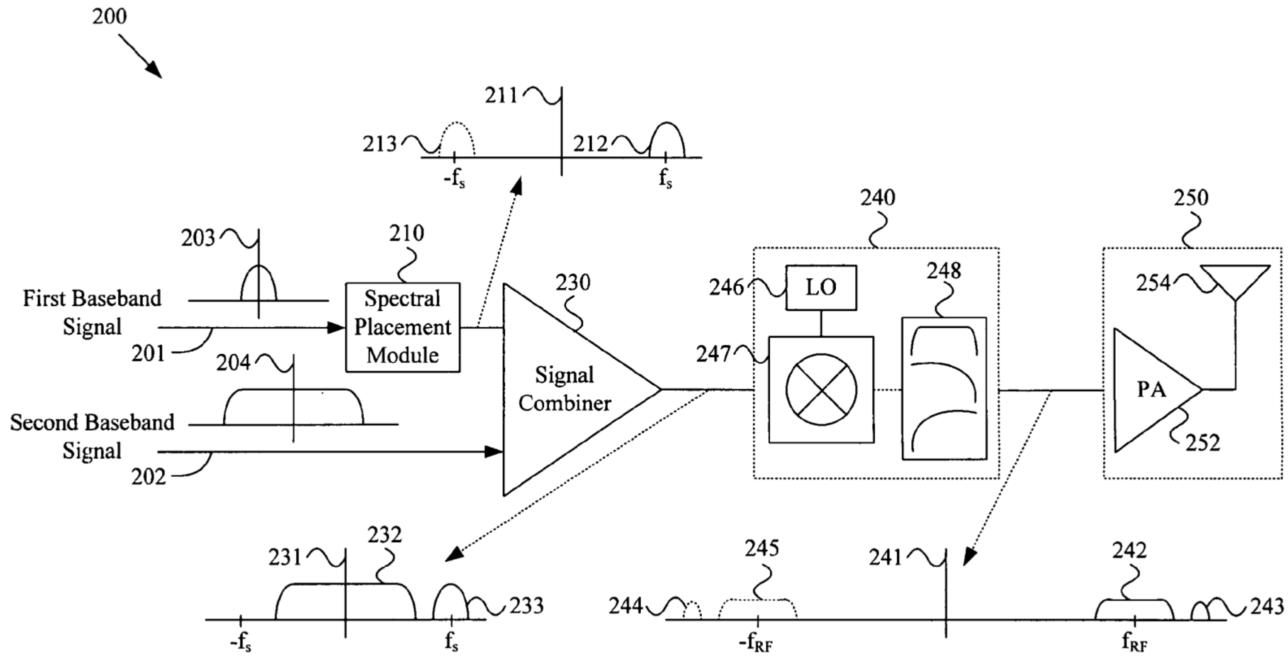
a first up-converted analog signal comprising a first up-converted frequency range from the first RF frequency minus one-half the first frequency range to the first RF frequency plus one-half the first frequency range;	 Figure 2 *See, e.g.*, Rofougaran at Figure 2.

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	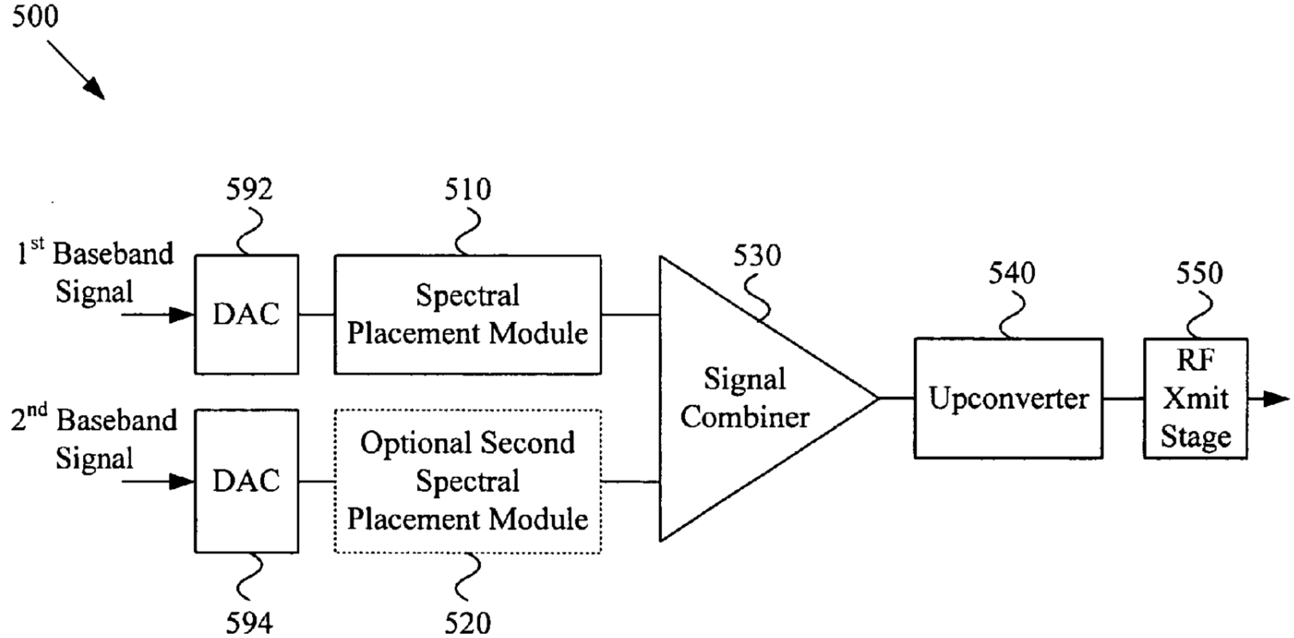 Figure 5 *See, e.g.*, Rofougaran at Figure 5.

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	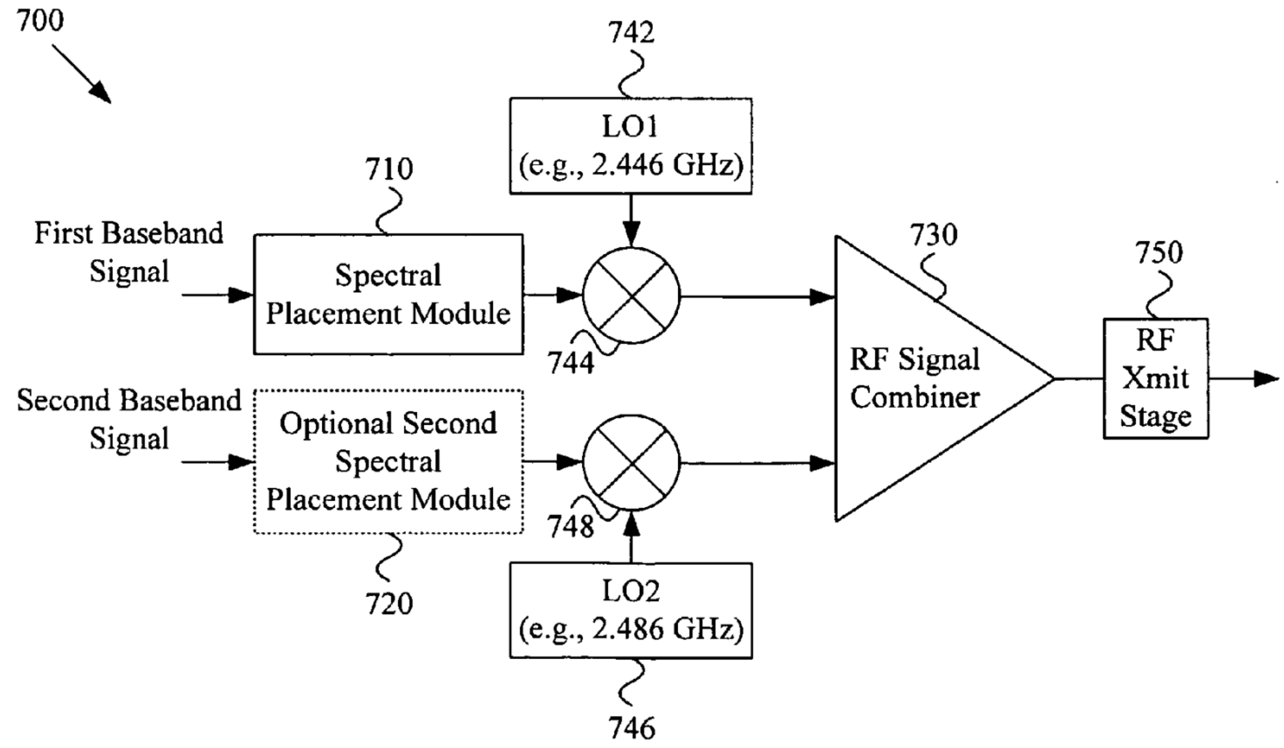 Figure 7 *See, e.g.*, Rofougaran at Figure 7. FIG. 1 is a diagram showing a portion of a first non-limiting exemplary communication system 100, in accordance with various aspects of the present invention. The communication system (or device) may comprise characteristics of any of a variety of communication systems/devices (e.g., multimode wireless communication devices). For example and without limitation, the communication system may comprise characteristics of any of a variety of mobile wireless communication devices (e.g.,

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	cellular phones, paging devices, portable email devices, etc.). Also for example, the communication system may comprise characteristics of fixed communication systems or devices (e.g., network access points, base stations, satellites, wireless routers, set top boxes, etc.). Further for example, the communication system may comprise characteristics of a variety of electronic devices with wireless communication capability (e.g., televisions, music players, cameras, remote controls, personal digital assistants, handheld computers, gaming devices, etc.). Accordingly, the scope of various aspects of the present invention should not be limited by characteristics of particular communication systems or devices. The following discussion will, at times, refer to various communication modes. A multimode communication device may, for example, be adapted to communicate in a plurality of such communication modes. For the following discussion, a communication mode may generally be considered to coincide with communication utilizing a particular communication protocol or standard. A non-limiting list of exemplary communication protocols includes various cellular communication protocols (e.g., GSM, GPRS, EDGE, CDMA, WCDMA, TDMA, PDC, etc.), various wireless networking protocols or standards, including WLAN, WMAN, WPAN and WWAN (e.g., IEEE 802.11, Bluetooth, IEEE 802.15, UWB, IEEE 802.16, IEEE 802.20, Zigbee, any WiFi protocol, etc.), various television communication standards, etc. The scope of various aspects of the present invention should not be limited by characteristics of particular communication modes or protocols, whether standard or proprietary. The exemplary communication system 100 may comprise at least a first input 101 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to any of the previously mentioned communication protocols. The exemplary communication system 100 may also comprise at least a second input 102 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first

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	communication protocol discussed above). For example and without limitation, the second baseband signal may correspond to any of the previously mentioned communication protocols. The first baseband signal and the second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of the communication system 100. For example, such modules may generate the first and second baseband signals independently (e.g., corresponding to independent respective communications). Alternatively, for example, such modules may generate the first and second baseband signals in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first and second baseband signals for a single communication). The exemplary communication system 100 may additionally comprise a spectral placement module 110 that is adapted to spectrally shift the first baseband signal (i.e., shift the frequency spectrum of the first baseband signal). In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to spectrally shift the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with the second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to implement a frequency-hopping scheme with the first baseband signal. For example, in a scenario, where there are one or more frequency bands (e.g., a second frequency space) associated with the second baseband signal, the spectral placement module 110 may be adapted to shift the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. *See, e.g.*, Rofougaran at 2:38-3:58. The exemplary communication system 100 may also comprise a second spectral placement module 120. Such a second spectral placement module 120 may, for example, share any or all characteristics

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	with the spectral placement module 110 discussed previously. The incorporation of such a second spectral placement module 120 may, for example, provide spectral shifting flexibility. For example, in such an exemplary configuration, either or both of the first and second baseband signals may be spectrally shifted to substantially distinct frequency spaces. Also for example, in such an exemplary configuration, either or both of the first and second baseband signals may be frequency hopped. Note that though the second spectral placement module 120 is illustrated separate from the first spectral placement module 110, the second spectral placement module 120 may share any or all hardware and/or software components with the spectral placement module 110. The exemplary communication system 100 may further comprise a signal combiner 130 that is adapted to generate a composite signal comprising various input signals to the signal combiner 130. For example, the composite signal may simultaneously (i.e., at an instant in time) comprise components associated with various input signals. Note that such simultaneity need not always be present. For example, at a first instant in time, the signal output from the signal combiner 130 might comprise a plurality of components associated with a plurality of respective input signals, at a second instant in time, the signal output from the signal combiner 130 might comprise a single component associated with a single respective input signal, and at a third instant in time, the signal output from the signal combiner 130 might comprise no components. In a first non-limiting exemplary scenario, the signal combiner 130 may receive a first signal that is based on the first baseband signal (e.g., associated with a first communication protocol). Also, the signal combiner 130 may receive a second signal that is based on the second baseband signal (e.g., associated with a second communication protocol). In such a scenario, the signal combiner 130 may combine the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the first baseband signal and a second signal component based on the second baseband signal. In such a scenario, for example where the frequency spectra of the first and second baseband signals do not overlap, the first and second baseband signals might not be spectrally shifted prior to combining by the signal combiner 130. In such a scenario, the spectral placement module 110 (and optionally, the second spectral placement module 120) may receive a control signal indicating whether or not to perform spectral shifting and/or to what degree spectral shifting should be implemented.

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	See, e.g., Rofougaran at 4:16-67. Various components of the exemplary communication system 100 (and other communication systems illustrated and discussed herein) may be implemented in analog and/or digital circuitry. To illustrate this, the exemplary communication system 100 is not shown with analog-to-digital converters (ADCs) or digital-to-analog converters (DACs). FIGS. 4-6, to be discussed later, show various non-limiting exemplary configurations including such converters. FIG. 2 is a diagram showing a portion of a second non-limiting exemplary communication system 200, in accordance with various aspects of the present invention. The communication system 200 may, for example and without limitation, share any or all characteristics with the communication system 100 illustrated in FIG. 1 and discussed previously. The exemplary communication system 200 may comprise at least a first input 201 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to the Bluetooth communication protocol. FIG. 2 shows an exemplary frequency spectrum 203 associated with the first baseband signal. The exemplary communication system 200 may also comprise at least a second input 202 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first communication protocol discussed above). For example and without limitation, the first baseband signal may correspond to an IEEE 802.11 communication protocol (e.g., IEEE 802.11(b) or IEEE 802.11(g)). FIG. 2 shows an exemplary frequency spectrum 204 associated with the second baseband signal. *See, e.g.*, Rofougaran at 5:64-6:31.

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	In a non-limiting exemplary configuration illustrated in FIG. 2, the signal combiner 230 receives a first signal from the spectral placement module 210 that is based on the spectrally shifted first baseband signal. Also, the signal combiner 230 receives a second signal that is based on the second baseband signal. In such a configuration, the signal combiner 230 combines the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the spectrally shifted first baseband signal and a second signal component based on the second baseband signal (e.g., not spectrally shifted). FIG. 2 shows an exemplary frequency spectrum 231 associated with the composite signal formed by the signal combiner 230. The spectrum 231 comprises a first portion 233 corresponding to the first signal component, and a second portion 232 corresponding to the second signal component. Note that the first portion 233 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 232. The exemplary communication system 200 may also comprise an upconverter 240 adapted to upconvert a signal (e.g., the composite signal from the signal combiner 230) for transmission. The upconverter 240 may, for example and without limitation, share any or all characteristics with the upconverter 140 discussed previously. The upconverter 240 may, for example, comprise a mixer 247, a local oscillator 246 and one or more filters 248. The mixer 247 may, for example, receive the composite signal from the signal combiner 230 and an RF mixing signal at frequency fRF from a local oscillator 246. The upconverter 240 may, for example, filter the upconverted signal from the mixer 247 with one or more filters 248. The output of the upconverter 240 may, for example, comprise a signal indicative of the composite signal spectrally shifted to an RF frequency. FIG. 2 shows an exemplary frequency spectrum 241 associated with the RF signal formed by the upconverter 240. The frequency spectrum 241 comprises a first portion 243 corresponding to the first signal component and a second portion 242 corresponding to the second signal component. Note that the first portion 243 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 242. Also note that the first portion 243 and

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	second portion 242 might be formed with a first mirror portion 244 and second mirror portion 245, respectively. Note that a mirror portion may either be removed or may be kept for later processing. The exemplary communication system 200 may further comprise a RF transmission stage 250 adapted to transmit an RF signal. The RF transmission stage 250 may, for example and without limitation, share any or all characteristics with the RF transmission stage 150 discussed previously. Such an RF signal may, for example, be associated with the composite signal output from the signal combiner 230 and upconverted by the upconverter 240. The RF transmission stage 250 may, for example and without limitation, comprise a power amplifier 252, antenna 254 and other components generally associated with RF signal transmission. *See, e.g.*, Rofougaran at 6:66-7:57. For example, the spectral placement module 510, optional second spectral placement module 520 and signal combiner 530 may operate in the analog domain. The first digital-to-analog converter 592 may convert the first baseband signal to the analog domain for processing by the spectral placement module 510. The second digital-to-analog converter 594 may convert the second baseband signal to the analog domain for processing by the second spectral placement module 520 or signal combiner 530. The signal combiner 530 then combines signals in the analog domain to generate an analog composite signal, which is then upconverted and transmitted by the upconverter 540 and RF transmission stage 550, respectively. *See, e.g.*, Rofougaran at 9:30-41. FIG. 7 is a diagram showing a portion of a seventh non-limiting exemplary communication system 700, in accordance with various aspects of the present invention. The exemplary communication system 700 may, for example and without limitation, share any or all characteristics with the exemplary systems 100-600 illustrated in FIGS. 1-6 and discussed previously. The exemplary communication system 700 may comprise a first mixer 744 that receives a spectrally shifted first baseband signal from the spectral placement module 710 and a first RF mixing signal (e.g., a 2.446 GHz signal generally associated with the Bluetooth communication protocol) from a

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	first local oscillator 742. The exemplary communication system 700 may also comprise a second mixer 748 that receives a second baseband signal (or a spectrally shifted second baseband signal) and a second RF mixing signal (e.g., a 2.486 GHz signal generally associated with the IEEE 802.11(g) communication protocol) from a second local oscillator 746. The exemplary communication system 700 may comprise an RF signal combiner 730 that is adapted to combine input RF signals. The RF signal combiner 730 may, for example, receive and combine the output signals from the first mixer 744 and second mixer 748 to generate an RF composite signal. The exemplary communication system 700 may also comprise a RF transmission stage 750 that receives the RF composite signal from the RF signal combiner 730 and transmit the signal. *See*, *e.g.*, Rofougaran at 10:18-43. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 810 comprises receiving the first baseband signal, step 810 may comprise receiving the first baseband signal in any manner generally associated with receiving a baseband signal. The first baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 810 may, for example, comprise generating the first baseband signal independently (e.g., corresponding to an independent communication). Step 810 may alternatively, for example, comprise generating the first baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first baseband signal and other baseband signals for a single communication). The exemplary method 800 may, at step 820, comprise spectrally placing (or shifting) the first baseband signal (e.g., received at step 810). Step 820 may, for example and without limitation, share any or all functional characteristics with the spectral placement modules 110-710 of the exemplary systems 100-700 illustrated in FIGS. 1-7 and discussed previously.

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	Step 820 may, for example, comprise spectrally shifting the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with a second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, step 820 may comprise implementing a frequency-hopping scheme with the first baseband signal. For example, in a scenario where there are one or more frequency bands (e.g., a second frequency space) associated with a second baseband signal, step 820 may comprise spectrally shifting the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. In another non-limiting exemplary scenario, spectrally shifting the first baseband signal may result in the production of a spectral image (e.g., frequency content mirrored about a mixing frequency utilized to spectrally shift the first baseband signal). In such a scenario, step 820 may comprise accepting or rejecting the image. In a scenario where an image is rejected, step 820 may comprise rejecting the image in any of a variety of manners. For example and without limitation, step 820 may comprise performing image reject mixing to spectrally shift the first baseband signal. Such image reject mixing generally comprises spectrally shifting a signal and rejecting an image associated with the spectrally shifted signal. Also for example, step 820 may comprise filtering out an unwanted image. The scope of various aspects of the present invention should not be limited by the utilization of image rejection or by any particular manner of performing such image rejection. The exemplary method 800 may, at step 830, comprise generating and/or receiving a second baseband signal corresponding to a second communication protocol (e.g., different from the first communication protocol). Step 830 may, for example and without limitation, share any or all functional characteristics with the second input 102 of the exemplary system 100 illustrated in FIG. 1 and discussed previously.

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	The second baseband signal may, for example, correspond to a second communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 830 comprises receiving the second baseband signal, step 830 may comprise receiving the second baseband signal in any manner generally associated with receiving a baseband signal. The second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 830 may, for example, comprise generating the second baseband signal independently (e.g., corresponding to a communication independent of a communication associated with the first baseband signal). Step 830 may alternatively, for example, comprise generating the second baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the second baseband signal and the first baseband signal for a single communication). *See, e.g.*, Rofougaran at 11:53-13:4. Furthermore, this claim element is obvious in light of Rofougaran itself, when combined with any of the other references as charted for this claim element in Exs. A-1–A-31, First Supplemental Ex. A-Obviousness Chart, and/or when combined with the knowledge of one of ordinary skill in the art. Motivations to combine may come from the knowledge of the person of ordinary skill themselves, or from the known problems and predictable solutions as embodied in these references. Further motivations to combine references and additional details may be found in the Cover Pleading and First Supplemental Ex. A-Obviousness Chart.
[17.6] a second up-converter circuit having a first input coupled to receive the second analog signal and a second input coupled to receive a second modulation signal having a second RF frequency, wherein the second	Rofougaran discloses “a second up-converter circuit having a first input coupled to receive the second analog signal and a second input coupled to receive a second modulation signal having a second RF frequency, wherein the second up-converter outputs a second up-converted analog signal comprising a second up-converted frequency range from the second RF frequency minus one-half the second frequency range to the second RF frequency plus one-half the second frequency range, and wherein frequency difference between the first RF frequency and the second RF frequency is greater than the sum of one-half the first frequency range and one-half the second frequency range.” See, e.g.:

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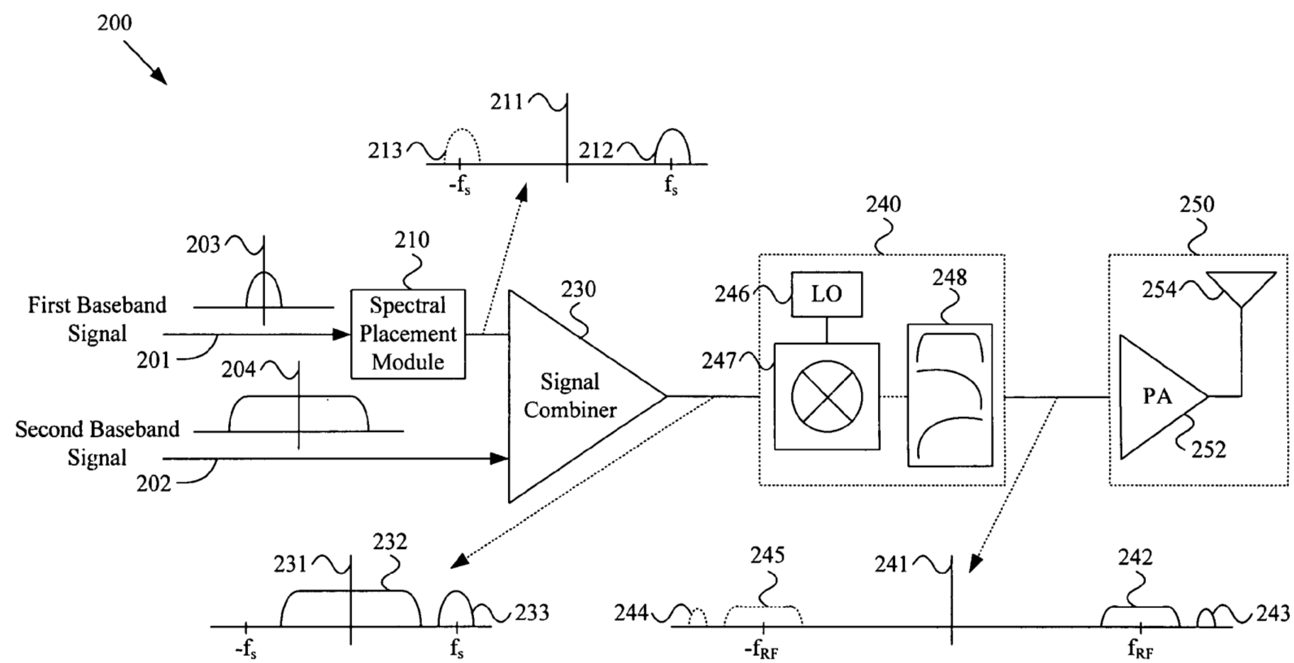
up-converter outputs a second up-converted analog signal comprising a second up-converted frequency range from the second RF frequency minus one-half the second frequency range to the second RF frequency plus one-half the second frequency range, and wherein frequency difference between the first RF frequency and the second RF frequency is greater than the sum of one-half the first frequency range and one-half the second frequency range; and	 Figure 2 *See, e.g.*, Rofougaran at Figure 2.

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	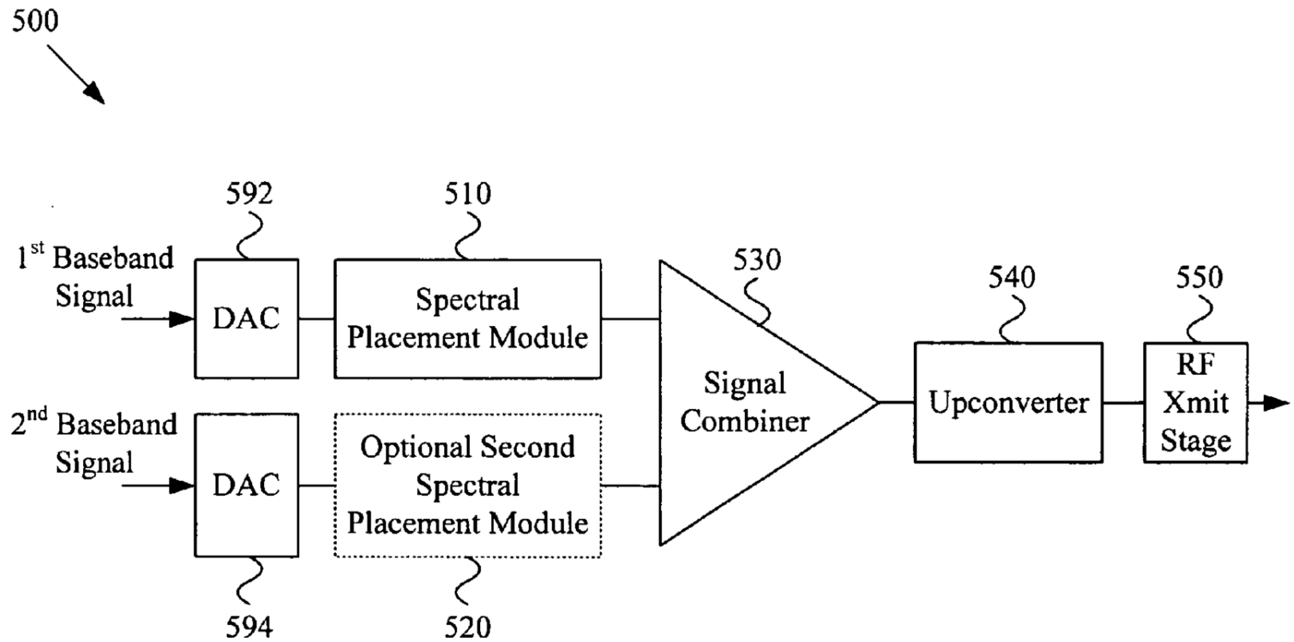 Figure 5 *See, e.g.*, Rofougaran at Figure 5.

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	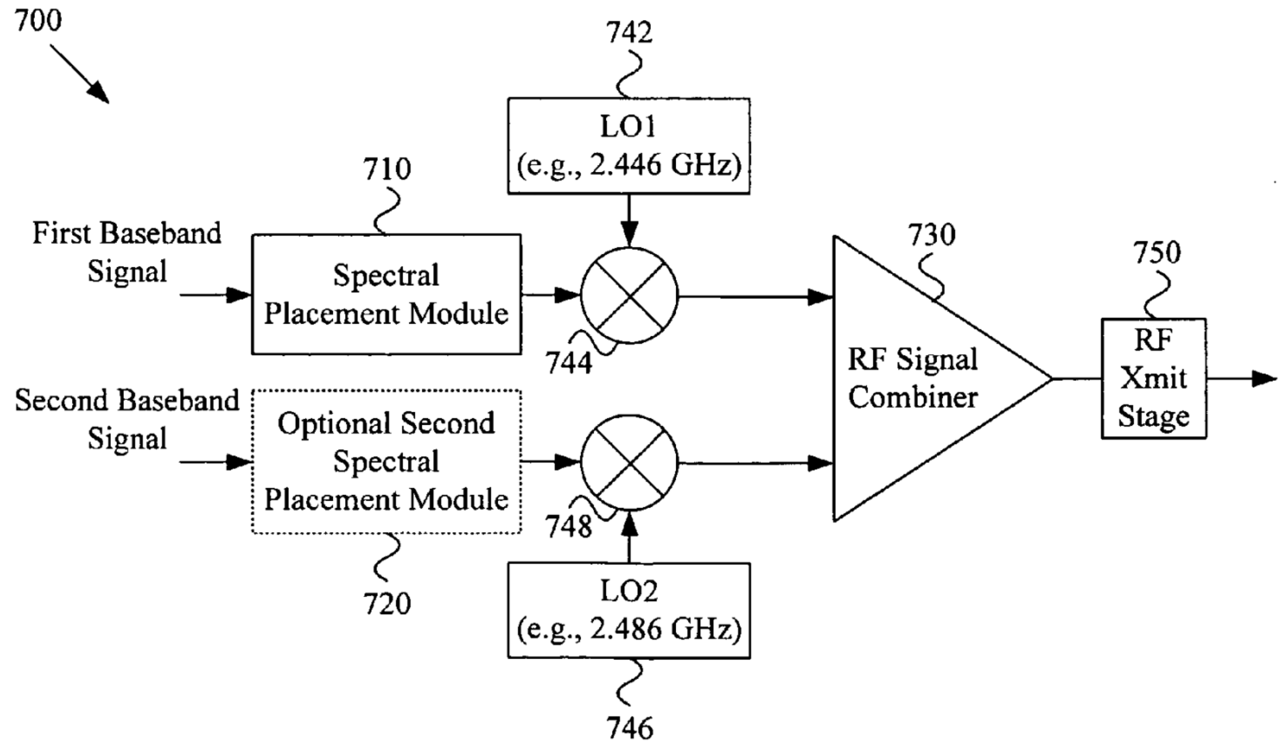 Figure 7 *See, e.g.*, Rofougaran at Figure 7. FIG. 1 is a diagram showing a portion of a first non-limiting exemplary communication system 100, in accordance with various aspects of the present invention. The communication system (or device) may comprise characteristics of any of a variety of communication systems/devices (e.g., multimode wireless communication devices). For example and without limitation, the communication system may comprise characteristics of any of a variety of mobile wireless communication devices (e.g.,

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	cellular phones, paging devices, portable email devices, etc.). Also for example, the communication system may comprise characteristics of fixed communication systems or devices (e.g., network access points, base stations, satellites, wireless routers, set top boxes, etc.). Further for example, the communication system may comprise characteristics of a variety of electronic devices with wireless communication capability (e.g., televisions, music players, cameras, remote controls, personal digital assistants, handheld computers, gaming devices, etc.). Accordingly, the scope of various aspects of the present invention should not be limited by characteristics of particular communication systems or devices. The following discussion will, at times, refer to various communication modes. A multimode communication device may, for example, be adapted to communicate in a plurality of such communication modes. For the following discussion, a communication mode may generally be considered to coincide with communication utilizing a particular communication protocol or standard. A non-limiting list of exemplary communication protocols includes various cellular communication protocols (e.g., GSM, GPRS, EDGE, CDMA, WCDMA, TDMA, PDC, etc.), various wireless networking protocols or standards, including WLAN, WMAN, WPAN and WWAN (e.g., IEEE 802.11, Bluetooth, IEEE 802.15, UWB, IEEE 802.16, IEEE 802.20, Zigbee, any WiFi protocol, etc.), various television communication standards, etc. The scope of various aspects of the present invention should not be limited by characteristics of particular communication modes or protocols, whether standard or proprietary. The exemplary communication system 100 may comprise at least a first input 101 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to any of the previously mentioned communication protocols. The exemplary communication system 100 may also comprise at least a second input 102 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first

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	communication protocol discussed above). For example and without limitation, the second baseband signal may correspond to any of the previously mentioned communication protocols. The first baseband signal and the second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of the communication system 100. For example, such modules may generate the first and second baseband signals independently (e.g., corresponding to independent respective communications). Alternatively, for example, such modules may generate the first and second baseband signals in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first and second baseband signals for a single communication). The exemplary communication system 100 may additionally comprise a spectral placement module 110 that is adapted to spectrally shift the first baseband signal (i.e., shift the frequency spectrum of the first baseband signal). In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to spectrally shift the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with the second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to implement a frequency-hopping scheme with the first baseband signal. For example, in a scenario, where there are one or more frequency bands (e.g., a second frequency space) associated with the second baseband signal, the spectral placement module 110 may be adapted to shift the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. *See, e.g.*, Rofougaran at 2:38-3:58. The exemplary communication system 100 may also comprise a second spectral placement module 120. Such a second spectral placement module 120 may, for example, share any or all characteristics

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	with the spectral placement module 110 discussed previously. The incorporation of such a second spectral placement module 120 may, for example, provide spectral shifting flexibility. For example, in such an exemplary configuration, either or both of the first and second baseband signals may be spectrally shifted to substantially distinct frequency spaces. Also for example, in such an exemplary configuration, either or both of the first and second baseband signals may be frequency hopped. Note that though the second spectral placement module 120 is illustrated separate from the first spectral placement module 110, the second spectral placement module 120 may share any or all hardware and/or software components with the spectral placement module 110. The exemplary communication system 100 may further comprise a signal combiner 130 that is adapted to generate a composite signal comprising various input signals to the signal combiner 130. For example, the composite signal may simultaneously (i.e., at an instant in time) comprise components associated with various input signals. Note that such simultaneity need not always be present. For example, at a first instant in time, the signal output from the signal combiner 130 might comprise a plurality of components associated with a plurality of respective input signals, at a second instant in time, the signal output from the signal combiner 130 might comprise a single component associated with a single respective input signal, and at a third instant in time, the signal output from the signal combiner 130 might comprise no components. In a first non-limiting exemplary scenario, the signal combiner 130 may receive a first signal that is based on the first baseband signal (e.g., associated with a first communication protocol). Also, the signal combiner 130 may receive a second signal that is based on the second baseband signal (e.g., associated with a second communication protocol). In such a scenario, the signal combiner 130 may combine the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the first baseband signal and a second signal component based on the second baseband signal. In such a scenario, for example where the frequency spectra of the first and second baseband signals do not overlap, the first and second baseband signals might not be spectrally shifted prior to combining by the signal combiner 130. In such a scenario, the spectral placement module 110 (and optionally, the second spectral placement module 120) may receive a control signal indicating whether or not to perform spectral shifting and/or to what degree spectral shifting should be implemented.

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	See, e.g., Rofougaran at 4:16-67. Various components of the exemplary communication system 100 (and other communication systems illustrated and discussed herein) may be implemented in analog and/or digital circuitry. To illustrate this, the exemplary communication system 100 is not shown with analog-to-digital converters (ADCs) or digital-to-analog converters (DACs). FIGS. 4-6, to be discussed later, show various non-limiting exemplary configurations including such converters. FIG. 2 is a diagram showing a portion of a second non-limiting exemplary communication system 200, in accordance with various aspects of the present invention. The communication system 200 may, for example and without limitation, share any or all characteristics with the communication system 100 illustrated in FIG. 1 and discussed previously. The exemplary communication system 200 may comprise at least a first input 201 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to the Bluetooth communication protocol. FIG. 2 shows an exemplary frequency spectrum 203 associated with the first baseband signal. The exemplary communication system 200 may also comprise at least a second input 202 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first communication protocol discussed above). For example and without limitation, the first baseband signal may correspond to an IEEE 802.11 communication protocol (e.g., IEEE 802.11(b) or IEEE 802.11(g)). FIG. 2 shows an exemplary frequency spectrum 204 associated with the second baseband signal. *See, e.g.*, Rofougaran at 5:64-6:31.

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	In a non-limiting exemplary configuration illustrated in FIG. 2, the signal combiner 230 receives a first signal from the spectral placement module 210 that is based on the spectrally shifted first baseband signal. Also, the signal combiner 230 receives a second signal that is based on the second baseband signal. In such a configuration, the signal combiner 230 combines the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the spectrally shifted first baseband signal and a second signal component based on the second baseband signal (e.g., not spectrally shifted). FIG. 2 shows an exemplary frequency spectrum 231 associated with the composite signal formed by the signal combiner 230. The spectrum 231 comprises a first portion 233 corresponding to the first signal component, and a second portion 232 corresponding to the second signal component. Note that the first portion 233 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 232. The exemplary communication system 200 may also comprise an upconverter 240 adapted to upconvert a signal (e.g., the composite signal from the signal combiner 230) for transmission. The upconverter 240 may, for example and without limitation, share any or all characteristics with the upconverter 140 discussed previously. The upconverter 240 may, for example, comprise a mixer 247, a local oscillator 246 and one or more filters 248. The mixer 247 may, for example, receive the composite signal from the signal combiner 230 and an RF mixing signal at frequency fRF from a local oscillator 246. The upconverter 240 may, for example, filter the upconverted signal from the mixer 247 with one or more filters 248. The output of the upconverter 240 may, for example, comprise a signal indicative of the composite signal spectrally shifted to an RF frequency. FIG. 2 shows an exemplary frequency spectrum 241 associated with the RF signal formed by the upconverter 240. The frequency spectrum 241 comprises a first portion 243 corresponding to the first signal component and a second portion 242 corresponding to the second signal component. Note that the first portion 243 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 242. Also note that the first portion 243 and

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	second portion 242 might be formed with a first mirror portion 244 and second mirror portion 245, respectively. Note that a mirror portion may either be removed or may be kept for later processing. The exemplary communication system 200 may further comprise a RF transmission stage 250 adapted to transmit an RF signal. The RF transmission stage 250 may, for example and without limitation, share any or all characteristics with the RF transmission stage 150 discussed previously. Such an RF signal may, for example, be associated with the composite signal output from the signal combiner 230 and upconverted by the upconverter 240. The RF transmission stage 250 may, for example and without limitation, comprise a power amplifier 252, antenna 254 and other components generally associated with RF signal transmission. *See, e.g.*, Rofougaran at 6:66-7:57. For example, the spectral placement module 510, optional second spectral placement module 520 and signal combiner 530 may operate in the analog domain. The first digital-to-analog converter 592 may convert the first baseband signal to the analog domain for processing by the spectral placement module 510. The second digital-to-analog converter 594 may convert the second baseband signal to the analog domain for processing by the second spectral placement module 520 or signal combiner 530. The signal combiner 530 then combines signals in the analog domain to generate an analog composite signal, which is then upconverted and transmitted by the upconverter 540 and RF transmission stage 550, respectively. *See, e.g.*, Rofougaran at 9:30-41. FIG. 7 is a diagram showing a portion of a seventh non-limiting exemplary communication system 700, in accordance with various aspects of the present invention. The exemplary communication system 700 may, for example and without limitation, share any or all characteristics with the exemplary systems 100-600 illustrated in FIGS. 1-6 and discussed previously. The exemplary communication system 700 may comprise a first mixer 744 that receives a spectrally shifted first baseband signal from the spectral placement module 710 and a first RF mixing signal (e.g., a 2.446 GHz signal generally associated with the Bluetooth communication protocol) from a

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	first local oscillator 742. The exemplary communication system 700 may also comprise a second mixer 748 that receives a second baseband signal (or a spectrally shifted second baseband signal) and a second RF mixing signal (e.g., a 2.486 GHz signal generally associated with the IEEE 802.11(g) communication protocol) from a second local oscillator 746. The exemplary communication system 700 may comprise an RF signal combiner 730 that is adapted to combine input RF signals. The RF signal combiner 730 may, for example, receive and combine the output signals from the first mixer 744 and second mixer 748 to generate an RF composite signal. The exemplary communication system 700 may also comprise a RF transmission stage 750 that receives the RF composite signal from the RF signal combiner 730 and transmit the signal. *See, e.g.*, Rofougaran at 10:18-43. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 810 comprises receiving the first baseband signal, step 810 may comprise receiving the first baseband signal in any manner generally associated with receiving a baseband signal. The first baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 810 may, for example, comprise generating the first baseband signal independently (e.g., corresponding to an independent communication). Step 810 may alternatively, for example, comprise generating the first baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first baseband signal and other baseband signals for a single communication). The exemplary method 800 may, at step 820, comprise spectrally placing (or shifting) the first baseband signal (e.g., received at step 810). Step 820 may, for example and without limitation, share any or all functional characteristics with the spectral placement modules 110-710 of the exemplary systems 100-700 illustrated in FIGS. 1-7 and discussed previously.

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	Step 820 may, for example, comprise spectrally shifting the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with a second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, step 820 may comprise implementing a frequency-hopping scheme with the first baseband signal. For example, in a scenario where there are one or more frequency bands (e.g., a second frequency space) associated with a second baseband signal, step 820 may comprise spectrally shifting the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. In another non-limiting exemplary scenario, spectrally shifting the first baseband signal may result in the production of a spectral image (e.g., frequency content mirrored about a mixing frequency utilized to spectrally shift the first baseband signal). In such a scenario, step 820 may comprise accepting or rejecting the image. In a scenario where an image is rejected, step 820 may comprise rejecting the image in any of a variety of manners. For example and without limitation, step 820 may comprise performing image reject mixing to spectrally shift the first baseband signal. Such image reject mixing generally comprises spectrally shifting a signal and rejecting an image associated with the spectrally shifted signal. Also for example, step 820 may comprise filtering out an unwanted image. The scope of various aspects of the present invention should not be limited by the utilization of image rejection or by any particular manner of performing such image rejection. The exemplary method 800 may, at step 830, comprise generating and/or receiving a second baseband signal corresponding to a second communication protocol (e.g., different from the first communication protocol). Step 830 may, for example and without limitation, share any or all functional characteristics with the second input 102 of the exemplary system 100 illustrated in FIG. 1 and discussed previously.

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	The second baseband signal may, for example, correspond to a second communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 830 comprises receiving the second baseband signal, step 830 may comprise receiving the second baseband signal in any manner generally associated with receiving a baseband signal. The second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 830 may, for example, comprise generating the second baseband signal independently (e.g., corresponding to a communication independent of a communication associated with the first baseband signal). Step 830 may alternatively, for example, comprise generating the second baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the second baseband signal and the first baseband signal for a single communication). *See, e.g.*, Rofougaran at 11:53-13:4. Furthermore, this claim element is obvious in light of Rofougaran itself, when combined with any of the other references as charted for this claim element in Exs. A-1–A-31, First Supplemental Ex. A-Obviousness Chart, and/or when combined with the knowledge of one of ordinary skill in the art. Motivations to combine may come from the knowledge of the person of ordinary skill themselves, or from the known problems and predictable solutions as embodied in these references. Further motivations to combine references and additional details may be found in the Cover Pleading and First Supplemental Ex. A-Obviousness Chart.
[17.7] a power amplifier coupled to receive the first and second up-converted analog signals, wherein the bandwidth of the power amplifier is greater than the difference between a lowest frequency in the first up-	Rofougaran discloses “a power amplifier coupled to receive the first and second up-converted analog signals, wherein the bandwidth of the power amplifier is greater than the difference between a lowest frequency in the first up-converted frequency range and a highest frequency in the second up-converted frequency range.” See, e.g.:

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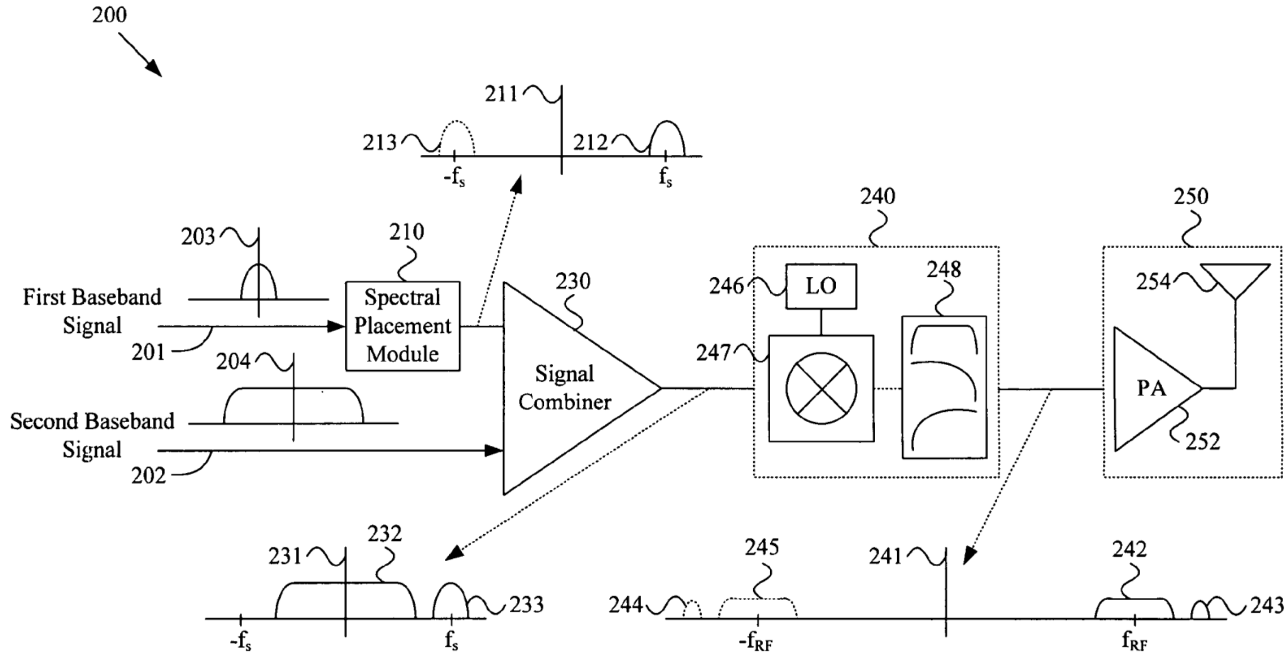
converted frequency range and a highest frequency in the second up-converted frequency range.	 Figure 2 *See, e.g.*, Rofougaran at Figure 2.

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	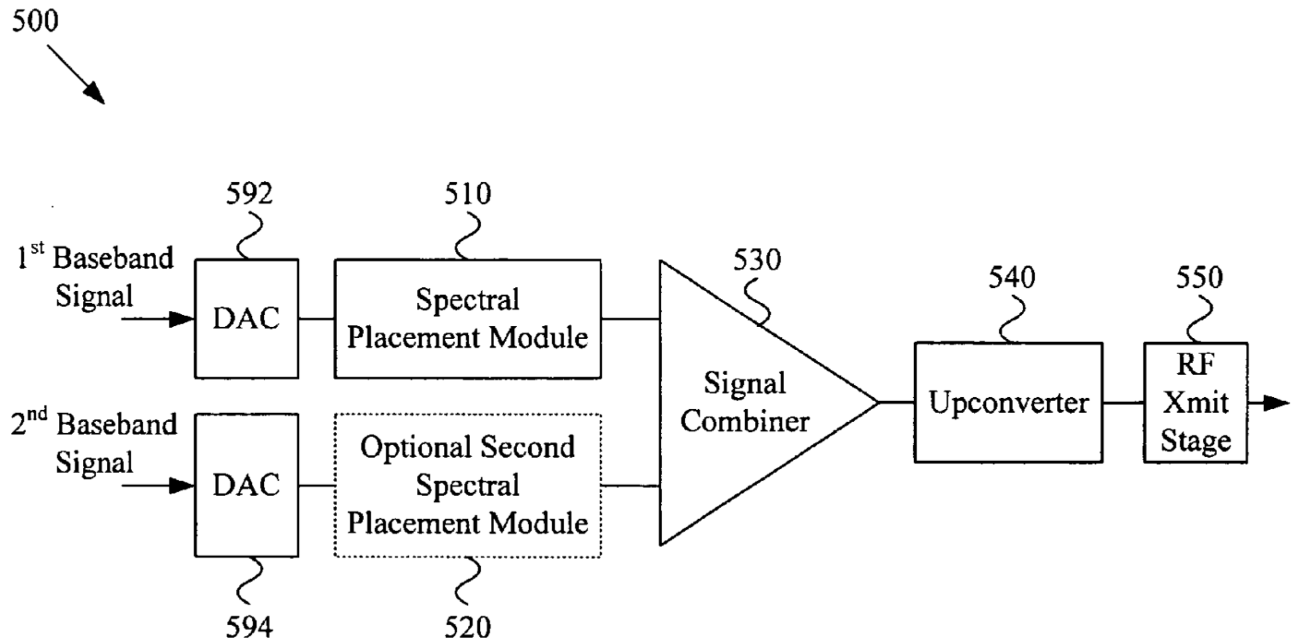 Figure 5 *See, e.g.*, Rofougaran at Figure 5.

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	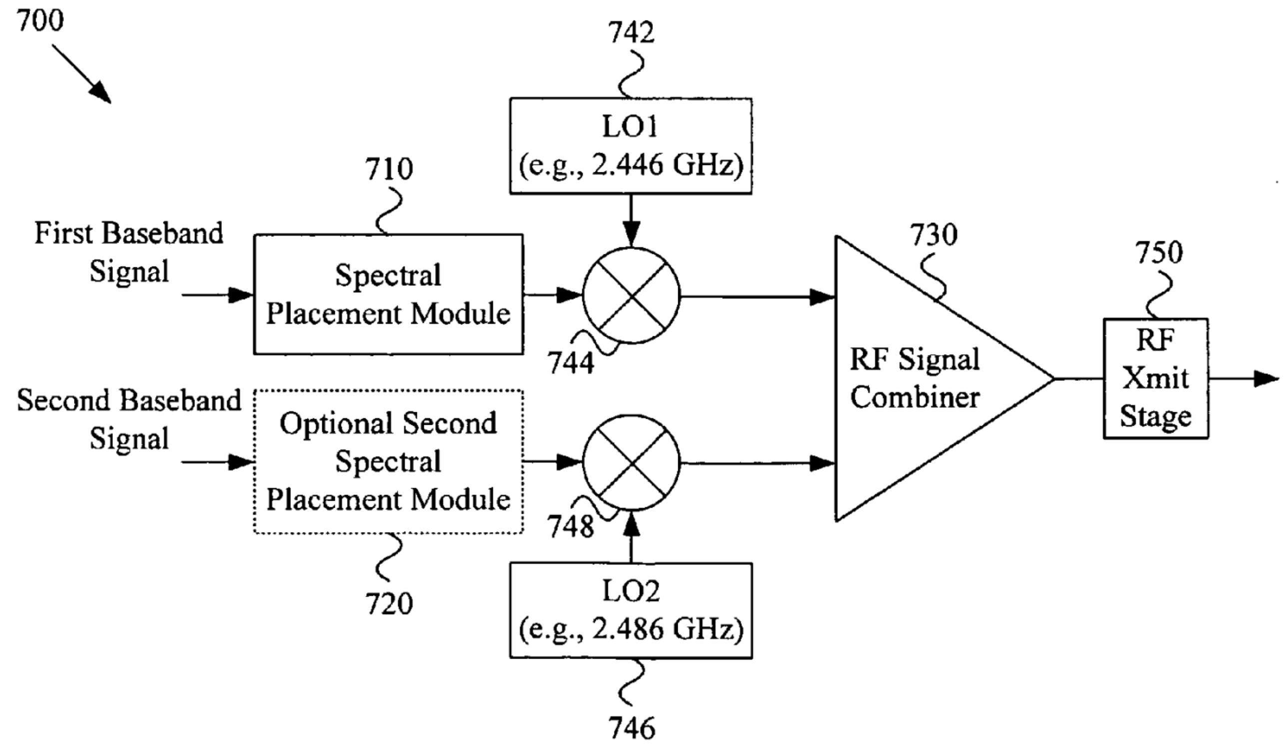 Figure 7 *See, e.g.*, Rofougaran at Figure 7. FIG. 1 is a diagram showing a portion of a first non-limiting exemplary communication system 100, in accordance with various aspects of the present invention. The communication system (or device) may comprise characteristics of any of a variety of communication systems/devices (e.g., multimode wireless communication devices). For example and without limitation, the communication system may comprise characteristics of any of a variety of mobile wireless communication devices (e.g.,

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	cellular phones, paging devices, portable email devices, etc.). Also for example, the communication system may comprise characteristics of fixed communication systems or devices (e.g., network access points, base stations, satellites, wireless routers, set top boxes, etc.). Further for example, the communication system may comprise characteristics of a variety of electronic devices with wireless communication capability (e.g., televisions, music players, cameras, remote controls, personal digital assistants, handheld computers, gaming devices, etc.). Accordingly, the scope of various aspects of the present invention should not be limited by characteristics of particular communication systems or devices. The following discussion will, at times, refer to various communication modes. A multimode communication device may, for example, be adapted to communicate in a plurality of such communication modes. For the following discussion, a communication mode may generally be considered to coincide with communication utilizing a particular communication protocol or standard. A non-limiting list of exemplary communication protocols includes various cellular communication protocols (e.g., GSM, GPRS, EDGE, CDMA, WCDMA, TDMA, PDC, etc.), various wireless networking protocols or standards, including WLAN, WMAN, WPAN and WWAN (e.g., IEEE 802.11, Bluetooth, IEEE 802.15, UWB, IEEE 802.16, IEEE 802.20, Zigbee, any WiFi protocol, etc.), various television communication standards, etc. The scope of various aspects of the present invention should not be limited by characteristics of particular communication modes or protocols, whether standard or proprietary. The exemplary communication system 100 may comprise at least a first input 101 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to any of the previously mentioned communication protocols. The exemplary communication system 100 may also comprise at least a second input 102 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first

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	communication protocol discussed above). For example and without limitation, the second baseband signal may correspond to any of the previously mentioned communication protocols. The first baseband signal and the second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of the communication system 100. For example, such modules may generate the first and second baseband signals independently (e.g., corresponding to independent respective communications). Alternatively, for example, such modules may generate the first and second baseband signals in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first and second baseband signals for a single communication). The exemplary communication system 100 may additionally comprise a spectral placement module 110 that is adapted to spectrally shift the first baseband signal (i.e., shift the frequency spectrum of the first baseband signal). In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to spectrally shift the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with the second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to implement a frequency-hopping scheme with the first baseband signal. For example, in a scenario, where there are one or more frequency bands (e.g., a second frequency space) associated with the second baseband signal, the spectral placement module 110 may be adapted to shift the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. *See, e.g.*, Rofougaran at 2:38-3:58. The exemplary communication system 100 may also comprise a second spectral placement module 120. Such a second spectral placement module 120 may, for example, share any or all characteristics

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	with the spectral placement module 110 discussed previously. The incorporation of such a second spectral placement module 120 may, for example, provide spectral shifting flexibility. For example, in such an exemplary configuration, either or both of the first and second baseband signals may be spectrally shifted to substantially distinct frequency spaces. Also for example, in such an exemplary configuration, either or both of the first and second baseband signals may be frequency hopped. Note that though the second spectral placement module 120 is illustrated separate from the first spectral placement module 110, the second spectral placement module 120 may share any or all hardware and/or software components with the spectral placement module 110. The exemplary communication system 100 may further comprise a signal combiner 130 that is adapted to generate a composite signal comprising various input signals to the signal combiner 130. For example, the composite signal may simultaneously (i.e., at an instant in time) comprise components associated with various input signals. Note that such simultaneity need not always be present. For example, at a first instant in time, the signal output from the signal combiner 130 might comprise a plurality of components associated with a plurality of respective input signals, at a second instant in time, the signal output from the signal combiner 130 might comprise a single component associated with a single respective input signal, and at a third instant in time, the signal output from the signal combiner 130 might comprise no components. In a first non-limiting exemplary scenario, the signal combiner 130 may receive a first signal that is based on the first baseband signal (e.g., associated with a first communication protocol). Also, the signal combiner 130 may receive a second signal that is based on the second baseband signal (e.g., associated with a second communication protocol). In such a scenario, the signal combiner 130 may combine the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the first baseband signal and a second signal component based on the second baseband signal. In such a scenario, for example where the frequency spectra of the first and second baseband signals do not overlap, the first and second baseband signals might not be spectrally shifted prior to combining by the signal combiner 130. In such a scenario, the spectral placement module 110 (and optionally, the second spectral placement module 120) may receive a control signal indicating whether or not to perform spectral shifting and/or to what degree spectral shifting should be implemented.

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	See, e.g., Rofougaran at 4:16-67. Various components of the exemplary communication system 100 (and other communication systems illustrated and discussed herein) may be implemented in analog and/or digital circuitry. To illustrate this, the exemplary communication system 100 is not shown with analog-to-digital converters (ADCs) or digital-to-analog converters (DACs). FIGS. 4-6, to be discussed later, show various non-limiting exemplary configurations including such converters. FIG. 2 is a diagram showing a portion of a second non-limiting exemplary communication system 200, in accordance with various aspects of the present invention. The communication system 200 may, for example and without limitation, share any or all characteristics with the communication system 100 illustrated in FIG. 1 and discussed previously. The exemplary communication system 200 may comprise at least a first input 201 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to the Bluetooth communication protocol. FIG. 2 shows an exemplary frequency spectrum 203 associated with the first baseband signal. The exemplary communication system 200 may also comprise at least a second input 202 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first communication protocol discussed above). For example and without limitation, the first baseband signal may correspond to an IEEE 802.11 communication protocol (e.g., IEEE 802.11(b) or IEEE 802.11(g)). FIG. 2 shows an exemplary frequency spectrum 204 associated with the second baseband signal. *See, e.g.*, Rofougaran at 5:64-6:31.

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	In a non-limiting exemplary configuration illustrated in FIG. 2, the signal combiner 230 receives a first signal from the spectral placement module 210 that is based on the spectrally shifted first baseband signal. Also, the signal combiner 230 receives a second signal that is based on the second baseband signal. In such a configuration, the signal combiner 230 combines the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the spectrally shifted first baseband signal and a second signal component based on the second baseband signal (e.g., not spectrally shifted). FIG. 2 shows an exemplary frequency spectrum 231 associated with the composite signal formed by the signal combiner 230. The spectrum 231 comprises a first portion 233 corresponding to the first signal component, and a second portion 232 corresponding to the second signal component. Note that the first portion 233 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 232. The exemplary communication system 200 may also comprise an upconverter 240 adapted to upconvert a signal (e.g., the composite signal from the signal combiner 230) for transmission. The upconverter 240 may, for example and without limitation, share any or all characteristics with the upconverter 140 discussed previously. The upconverter 240 may, for example, comprise a mixer 247, a local oscillator 246 and one or more filters 248. The mixer 247 may, for example, receive the composite signal from the signal combiner 230 and an RF mixing signal at frequency fRF from a local oscillator 246. The upconverter 240 may, for example, filter the upconverted signal from the mixer 247 with one or more filters 248. The output of the upconverter 240 may, for example, comprise a signal indicative of the composite signal spectrally shifted to an RF frequency. FIG. 2 shows an exemplary frequency spectrum 241 associated with the RF signal formed by the upconverter 240. The frequency spectrum 241 comprises a first portion 243 corresponding to the first signal component and a second portion 242 corresponding to the second signal component. Note that the first portion 243 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 242. Also note that the first portion 243 and

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	second portion 242 might be formed with a first mirror portion 244 and second mirror portion 245, respectively. Note that a mirror portion may either be removed or may be kept for later processing. The exemplary communication system 200 may further comprise a RF transmission stage 250 adapted to transmit an RF signal. The RF transmission stage 250 may, for example and without limitation, share any or all characteristics with the RF transmission stage 150 discussed previously. Such an RF signal may, for example, be associated with the composite signal output from the signal combiner 230 and upconverted by the upconverter 240. The RF transmission stage 250 may, for example and without limitation, comprise a power amplifier 252, antenna 254 and other components generally associated with RF signal transmission. *See, e.g.*, Rofougaran at 6:66-7:57. For example, the spectral placement module 510, optional second spectral placement module 520 and signal combiner 530 may operate in the analog domain. The first digital-to-analog converter 592 may convert the first baseband signal to the analog domain for processing by the spectral placement module 510. The second digital-to-analog converter 594 may convert the second baseband signal to the analog domain for processing by the second spectral placement module 520 or signal combiner 530. The signal combiner 530 then combines signals in the analog domain to generate an analog composite signal, which is then upconverted and transmitted by the upconverter 540 and RF transmission stage 550, respectively. *See, e.g.*, Rofougaran at 9:30-41. FIG. 7 is a diagram showing a portion of a seventh non-limiting exemplary communication system 700, in accordance with various aspects of the present invention. The exemplary communication system 700 may, for example and without limitation, share any or all characteristics with the exemplary systems 100-600 illustrated in FIGS. 1-6 and discussed previously. The exemplary communication system 700 may comprise a first mixer 744 that receives a spectrally shifted first baseband signal from the spectral placement module 710 and a first RF mixing signal (e.g., a 2.446 GHz signal generally associated with the Bluetooth communication protocol) from a

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	first local oscillator 742. The exemplary communication system 700 may also comprise a second mixer 748 that receives a second baseband signal (or a spectrally shifted second baseband signal) and a second RF mixing signal (e.g., a 2.486 GHz signal generally associated with the IEEE 802.11(g) communication protocol) from a second local oscillator 746. The exemplary communication system 700 may comprise an RF signal combiner 730 that is adapted to combine input RF signals. The RF signal combiner 730 may, for example, receive and combine the output signals from the first mixer 744 and second mixer 748 to generate an RF composite signal. The exemplary communication system 700 may also comprise a RF transmission stage 750 that receives the RF composite signal from the RF signal combiner 730 and transmit the signal. *See, e.g.*, Rofougaran at 10:18-43. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 810 comprises receiving the first baseband signal, step 810 may comprise receiving the first baseband signal in any manner generally associated with receiving a baseband signal. The first baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 810 may, for example, comprise generating the first baseband signal independently (e.g., corresponding to an independent communication). Step 810 may alternatively, for example, comprise generating the first baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first baseband signal and other baseband signals for a single communication). The exemplary method 800 may, at step 820, comprise spectrally placing (or shifting) the first baseband signal (e.g., received at step 810). Step 820 may, for example and without limitation, share any or all functional characteristics with the spectral placement modules 110-710 of the exemplary systems 100-700 illustrated in FIGS. 1-7 and discussed previously.

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	Step 820 may, for example, comprise spectrally shifting the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with a second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, step 820 may comprise implementing a frequency-hopping scheme with the first baseband signal. For example, in a scenario where there are one or more frequency bands (e.g., a second frequency space) associated with a second baseband signal, step 820 may comprise spectrally shifting the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. In another non-limiting exemplary scenario, spectrally shifting the first baseband signal may result in the production of a spectral image (e.g., frequency content mirrored about a mixing frequency utilized to spectrally shift the first baseband signal). In such a scenario, step 820 may comprise accepting or rejecting the image. In a scenario where an image is rejected, step 820 may comprise rejecting the image in any of a variety of manners. For example and without limitation, step 820 may comprise performing image reject mixing to spectrally shift the first baseband signal. Such image reject mixing generally comprises spectrally shifting a signal and rejecting an image associated with the spectrally shifted signal. Also for example, step 820 may comprise filtering out an unwanted image. The scope of various aspects of the present invention should not be limited by the utilization of image rejection or by any particular manner of performing such image rejection. The exemplary method 800 may, at step 830, comprise generating and/or receiving a second baseband signal corresponding to a second communication protocol (e.g., different from the first communication protocol). Step 830 may, for example and without limitation, share any or all functional characteristics with the second input 102 of the exemplary system 100 illustrated in FIG. 1 and discussed previously.

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	The second baseband signal may, for example, correspond to a second communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 830 comprises receiving the second baseband signal, step 830 may comprise receiving the second baseband signal in any manner generally associated with receiving a baseband signal. The second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 830 may, for example, comprise generating the second baseband signal independently (e.g., corresponding to a communication independent of a communication associated with the first baseband signal). Step 830 may alternatively, for example, comprise generating the second baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the second baseband signal and the first baseband signal for a single communication). *See, e.g.*, Rofougaran at 11:53-13:4. Furthermore, this claim element is obvious in light of Rofougaran itself, when combined with any of the other references as charted for this claim element in Exs. A-1–A-31, First Supplemental Ex. A-Obviousness Chart, and/or when combined with the knowledge of one of ordinary skill in the art. Motivations to combine may come from the knowledge of the person of ordinary skill themselves, or from the known problems and predictable solutions as embodied in these references. Further motivations to combine references and additional details may be found in the Cover Pleading and First Supplemental Ex. A-Obviousness Chart.

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[21.1] The communication system of claim 17	Rofougaran discloses all the elements of claim 17 for all the reasons provided above.
[21.2] wherein the first data of the first digital signal is encoded using a first wireless	Rofougaran discloses “wherein the first data of the first digital signal is encoded using a first wireless protocol and the first data of the second digital signal is encoded using a second wireless protocol.” See, e.g.:

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protocol and the first data of the second digital signal is encoded using a second wireless protocol.	FIG. 1 is a diagram showing a portion of a first non-limiting exemplary communication system 100, in accordance with various aspects of the present invention. The communication system (or device) may comprise characteristics of any of a variety of communication systems/devices (e.g., multimode wireless communication devices). For example and without limitation, the communication system may comprise characteristics of any of a variety of mobile wireless communication devices (e.g., cellular phones, paging devices, portable email devices, etc.). Also for example, the communication system may comprise characteristics of fixed communication systems or devices (e.g., network access points, base stations, satellites, wireless routers, set top boxes, etc.). Further for example, the communication system may comprise characteristics of a variety of electronic devices with wireless communication capability (e.g., televisions, music players, cameras, remote controls, personal digital assistants, handheld computers, gaming devices, etc.). Accordingly, the scope of various aspects of the present invention should not be limited by characteristics of particular communication systems or devices. The following discussion will, at times, refer to various communication modes. A multimode communication device may, for example, be adapted to communicate in a plurality of such communication modes. For the following discussion, a communication mode may generally be considered to coincide with communication utilizing a particular communication protocol or standard. A non-limiting list of exemplary communication protocols includes various cellular communication protocols (e.g., GSM, GPRS, EDGE, CDMA, WCDMA, TDMA, PDC, etc.), various wireless networking protocols or standards, including WLAN, WMAN, WPAN and WWAN (e.g., IEEE 802.11, Bluetooth, IEEE 802.15, UWB, IEEE 802.16, IEEE 802.20, Zigbee, any WiFi protocol, etc.), various television communication standards, etc. The scope of various aspects of the present invention should not be limited by characteristics of particular communication modes or protocols, whether standard or proprietary. The exemplary communication system 100 may comprise at least a first input 101 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or

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	standards). For example and without limitation, the first baseband signal may correspond to any of the previously mentioned communication protocols. The exemplary communication system 100 may also comprise at least a second input 102 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first communication protocol discussed above). For example and without limitation, the second baseband signal may correspond to any of the previously mentioned communication protocols. The first baseband signal and the second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of the communication system 100. For example, such modules may generate the first and second baseband signals independently (e.g., corresponding to independent respective communications). Alternatively, for example, such modules may generate the first and second baseband signals in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first and second baseband signals for a single communication). The exemplary communication system 100 may additionally comprise a spectral placement module 110 that is adapted to spectrally shift the first baseband signal (i.e., shift the frequency spectrum of the first baseband signal). In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to spectrally shift the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with the second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to implement a frequency-hopping scheme with the first baseband signal. For example, in a scenario, where there are one or more frequency bands (e.g., a second frequency space) associated with the second baseband signal, the spectral placement module 110 may be adapted to shift the first baseband

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	signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. *See*, *e.g.*, Rofougaran at 2:38-3:58. The exemplary communication system 100 may also comprise a second spectral placement module 120. Such a second spectral placement module 120 may, for example, share any or all characteristics with the spectral placement module 110 discussed previously. The incorporation of such a second spectral placement module 120 may, for example, provide spectral shifting flexibility. For example, in such an exemplary configuration, either or both of the first and second baseband signals may be spectrally shifted to substantially distinct frequency spaces. Also for example, in such an exemplary configuration, either or both of the first and second baseband signals may be frequency hopped. Note that though the second spectral placement module 120 is illustrated separate from the first spectral placement module 110, the second spectral placement module 120 may share any or all hard ware and/or software components with the spectral placement module 110. The exemplary communication system 100 may further comprise a signal combiner 130 that is adapted to generate a composite signal comprising various input signals to the signal combiner 130. For example, the composite signal may simultaneously (i.e., at an instant in time) comprise components associated with various input signals. Note that such simultaneity need not always be present. For example, at a first instant in time, the signal output from the signal combiner 130 might comprise a plurality of components associated with a plurality of respective input signals, at a second instant in time, the signal output from the signal combiner 130 might comprise a single component associated with a single respective input signal, and at a third instant in time, the signal output from the signal combiner 130 might comprise no components. In a first non-limiting exemplary scenario, the signal combiner 130 may receive a first signal that is based on the first baseband signal (e.g., associated with a first communication protocol). Also, the signal combiner 130 may receive a second signal that is based on the second baseband signal (e.g., associated with a second communication protocol). In such a scenario, the signal combiner 130 may combine the first and second signals to generate a composite signal, where the composite signal

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	simultaneously comprises a first signal component based on the first baseband signal and a second signal component based on the second baseband signal. In such a scenario, for example where the frequency spectra of the first and second baseband signals do not overlap, the first and second baseband signals might not be spectrally shifted prior to combining by the signal combiner 130. In such a scenario, the spectral placement module 110 (and optionally, the second spectral placement module 120) may receive a control signal indicating whether or not to perform spectral shifting and/or to what degree spectral shifting should be implemented. *See, e.g.*, Rofougaran at 4:16-67. Various components of the exemplary communication system 100 (and other communication systems illustrated and discussed herein) may be implemented in analog and/or digital circuitry. To illustrate this, the exemplary communication system 100 is not shown with analog-to-digital converters (ADCs) or digital-to-analog converters (DACs). FIGS. 4-6, to be discussed later, show various non-limiting exemplary configurations including such converters. FIG. 2 is a diagram showing a portion of a second non-limiting exemplary communication system 200, in accordance with various aspects of the present invention. The communication system 200 may, for example and without limitation, share any or all characteristics with the communication system 100 illustrated in FIG. 1 and discussed previously. The exemplary communication system 200 may comprise at least a first input 201 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to the Bluetooth communication protocol. FIG. 2 shows an exemplary frequency spectrum 203 associated with the first baseband signal. The exemplary communication system 200 may also comprise at least a second input 202 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first

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	communication protocol discussed above). For example and without limitation, the first baseband signal may correspond to an IEEE 802.11 communication protocol (e.g., IEEE 802.11(b) or IEEE 802.11(g)). FIG. 2 shows an exemplary frequency spectrum 204 associated with the second baseband signal. *See, e.g.*, Rofougaran at 5:64-6:31. In a non-limiting exemplary configuration illustrated in FIG. 2, the signal combiner 230 receives a first signal from the spectral placement module 210 that is based on the spectrally shifted first baseband signal. Also, the signal combiner 230 receives a second signal that is based on the second baseband signal. In such a configuration, the signal combiner 230 combines the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the spectrally shifted first baseband signal and a second signal component based on the second baseband signal (e.g., not spectrally shifted). FIG. 2 shows an exemplary frequency spectrum 231 associated with the composite signal formed by the signal combiner 230. The spectrum 231 comprises a first portion 233 corresponding to the first signal component, and a second portion 232 corresponding to the second signal component. Note that the first portion 233 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 232. The exemplary communication system 200 may also comprise an upconverter 240 adapted to upconvert a signal (e.g., the composite signal from the signal combiner 230) for transmission. The upconverter 240 may, for example and without limitation, share any or all characteristics with the upconverter 140 discussed previously. The upconverter 240 may, for example, comprise a mixer 247, a local oscillator 246 and one or more filters 248. The mixer 247 may, for example, receive the composite signal from the signal combiner 230 and an RF mixing signal at frequency fRF from a local oscillator 246. The upconverter 240 may, for example, filter the upconverted signal from the mixer 247 with one or more filters 248. The

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	output of the upconverter 240 may, for example, comprise a signal indicative of the composite signal spectrally shifted to an RF frequency. FIG. 2 shows an exemplary frequency spectrum 241 associated with the RF signal formed by the upconverter 240. The frequency spectrum 241 comprises a first portion 243 corresponding to the first signal component and a second portion 242 corresponding to the second signal component. Note that the first portion 243 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 242. Also note that the first portion 243 and second portion 242 might be formed with a first mirror portion 244 and second mirror portion 245, respectively. Note that a mirror portion may either be removed or may be kept for later processing. The exemplary communication system 200 may further comprise a RF transmission stage 250 adapted to transmit an RF signal. The RF transmission stage 250 may, for example and without limitation, share any or all characteristics with the RF transmission stage 150 discussed previously. Such an RF signal may, for example, be associated with the composite signal output from the signal combiner 230 and upconverted by the upconverter 240. The RF transmission stage 250 may, for example and without limitation, comprise a power amplifier 252, antenna 254 and other components generally associated with RF signal transmission. *See, e.g.*, Rofougaran at 6:66-7:57. For example, the spectral placement module 510, optional second spectral placement module 520 and signal combiner 530 may operate in the analog domain. The first digital-to-analog converter 592 may convert the first baseband signal to the analog domain for processing by the spectral placement module 510. The second digital-to-analog converter 594 may convert the second baseband signal to the analog domain for processing by the second spectral placement module 520 or signal combiner 530. The signal combiner 530 then combines signals in the analog domain to generate an analog composite signal, which is then upconverted and transmitted by the upconverter 540 and RF transmission stage 550, respectively. *See, e.g.*, Rofougaran at 9:30-41.

Claim 21 of the ’802 Patent	Prior Art Reference – Rofougaran
	FIG. 7 is a diagram showing a portion of a seventh non-limiting exemplary communication system 700, in accordance with various aspects of the present invention. The exemplary communication system 700 may, for example and without limitation, share any or all characteristics with the exemplary systems 100-600 illustrated in FIGS. 1-6 and discussed previously. The exemplary communication system 700 may comprise a first mixer 744 that receives a spectrally shifted first baseband signal from the spectral placement module 710 and a first RF mixing signal (e.g., a 2.446 GHz signal generally associated with the Bluetooth communication protocol) from a first local oscillator 742. The exemplary communication system 700 may also comprise a second mixer 748 that receives a second baseband signal (or a spectrally shifted second baseband signal) and a second RF mixing signal (e.g., a 2.486 GHz signal generally associated with the IEEE 802.11(g) communication protocol) from a second local oscillator 746. The exemplary communication system 700 may comprise an RF signal combiner 730 that is adapted to combine input RF signals. The RF signal combiner 730 may, for example, receive and combine the output signals from the first mixer 744 and second mixer 748 to generate an RF composite signal. The exemplary communication system 700 may also comprise a RF transmission stage 750 that receives the RF composite signal from the RF signal combiner 730 and transmit the signal. *See, e.g.*, Rofougaran at 10:18-43. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 810 comprises receiving the first baseband signal, step 810 may comprise receiving the first baseband signal in any manner generally associated with receiving a baseband signal. The first baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 810 may, for example, comprise generating the first baseband signal independently (e.g., corresponding to an independent communication). Step 810 may alternatively, for example, comprise generating the first baseband signal in a dependent manner (e.g., coordinating independent respective

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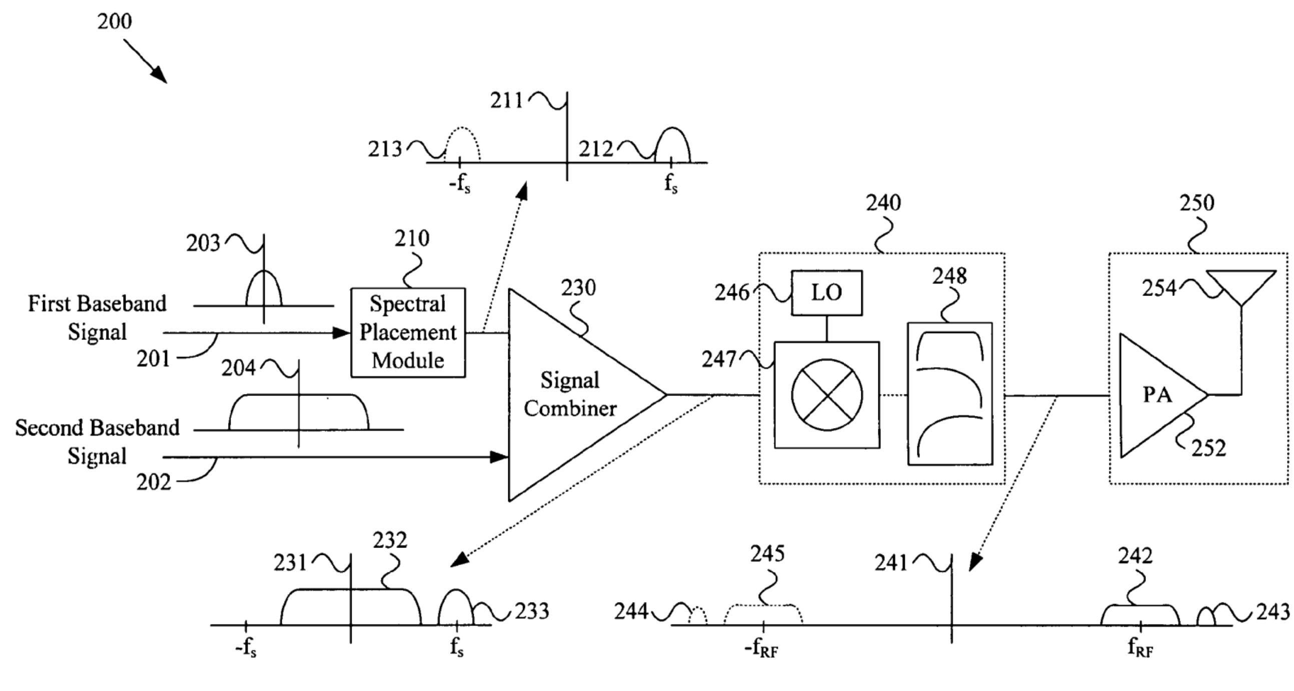
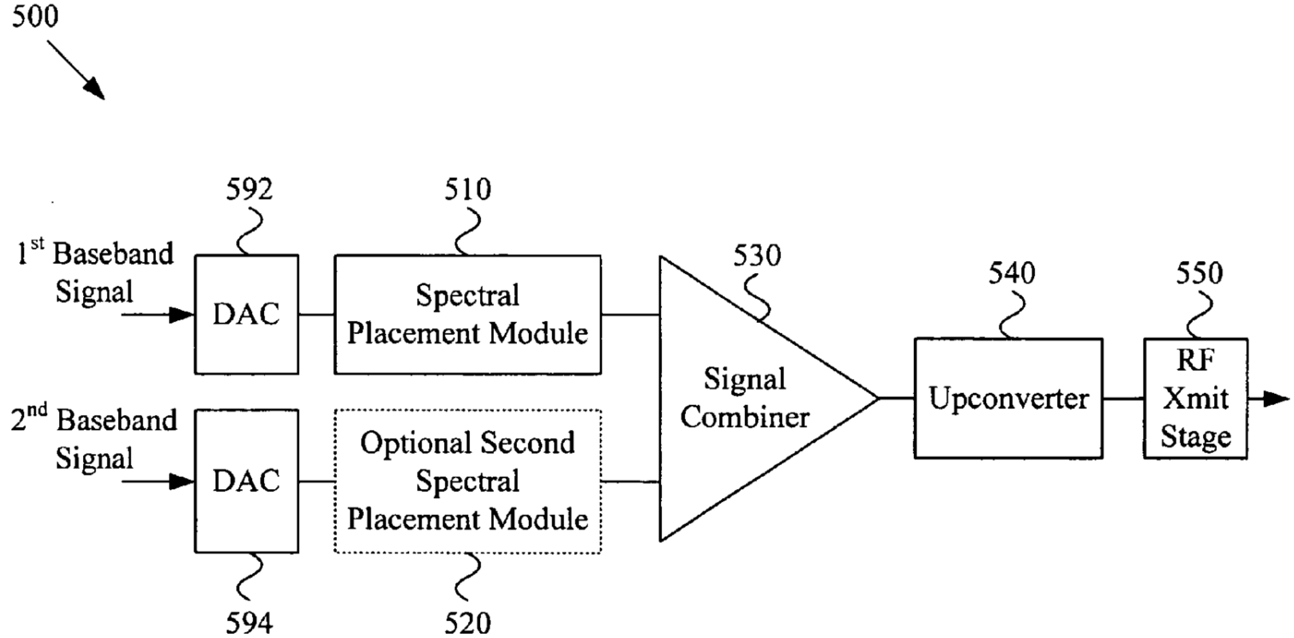
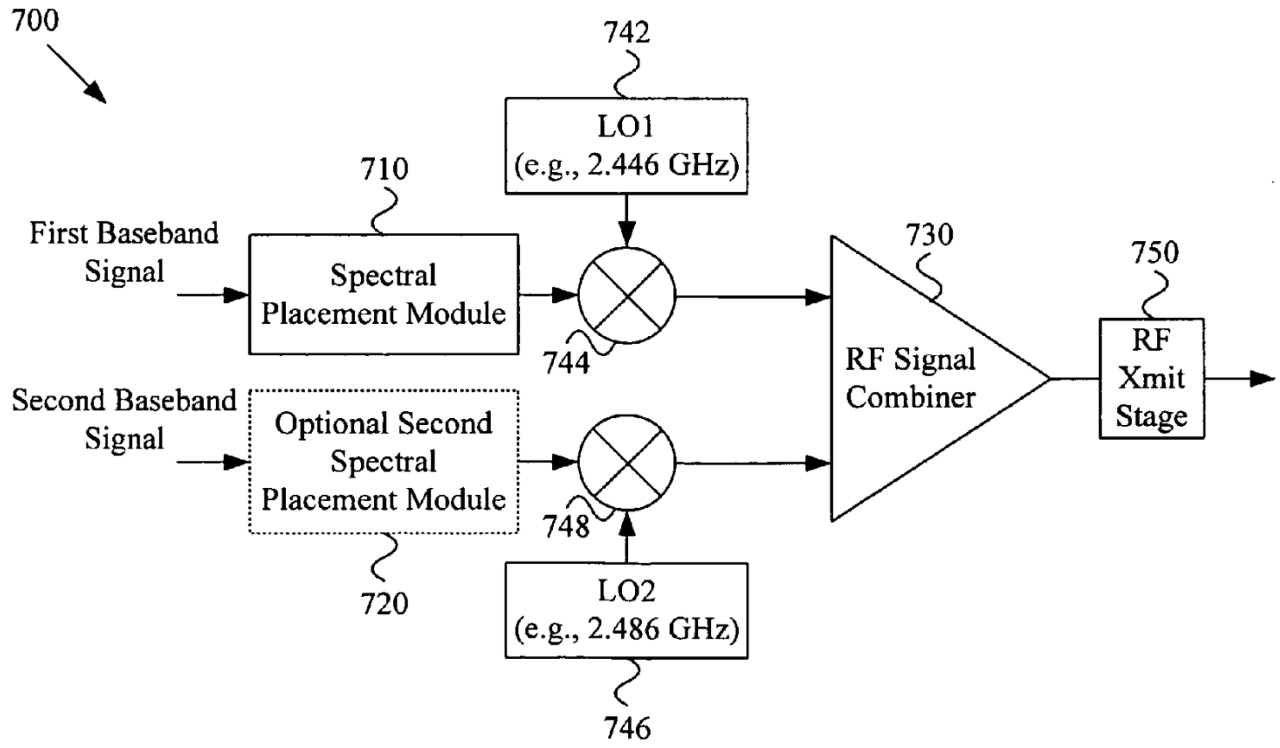
	communications or utilizing both the first baseband signal and other baseband signals for a single communication). The exemplary method 800 may, at step 820, comprise spectrally placing (or shifting) the first baseband signal (e.g., received at step 810). Step 820 may, for example and without limitation, share any or all functional characteristics with the spectral placement modules 110-710 of the exemplary systems 100-700 illustrated in FIGS. 1-7 and discussed previously. Step 820 may, for example, comprise spectrally shifting the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with a second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, step 820 may comprise implementing a frequency-hopping scheme with the first baseband signal. For example, in a scenario where there are one or more frequency bands (e.g., a second frequency space) associated with a second baseband signal, step 820 may comprise spectrally shifting the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. In another non-limiting exemplary scenario, spectrally shifting the first baseband signal may result in the production of a spectral image (e.g., frequency content mirrored about a mixing frequency utilized to spectrally shift the first baseband signal). In such a scenario, step 820 may comprise accepting or rejecting the image. In a scenario where an image is rejected, step 820 may comprise rejecting the image in any of a variety of manners. For example and without limitation, step 820 may comprise performing image reject mixing to spectrally shift the first baseband signal. Such image reject mixing generally comprises spectrally shifting a signal and rejecting an image associated with the spectrally shifted signal. Also for example, step 820 may comprise filtering out an unwanted image. The scope of

Claim 21 of the ’802 Patent	Prior Art Reference – Rofougaran
	various aspects of the present invention should not be limited by the utilization of image rejection or by any particular manner of performing such image rejection. The exemplary method 800 may, at step 830, comprise generating and/or receiving a second baseband signal corresponding to a second communication protocol (e.g., different from the first communication protocol). Step 830 may, for example and without limitation, share any or all functional characteristics with the second input 102 of the exemplary system 100 illustrated in FIG. 1 and discussed previously. The second baseband signal may, for example, correspond to a second communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 830 comprises receiving the second baseband signal, step 830 may comprise receiving the second baseband signal in any manner generally associated with receiving a baseband signal. The second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 830 may, for example, comprise generating the second baseband signal independently (e.g., corresponding to a communication independent of a communication associated with the first baseband signal). Step 830 may alternatively, for example, comprise generating the second baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the second baseband signal and the first baseband signal for a single communication). *See, e.g.*, Rofougaran at 11:53-13:4. Furthermore, this claim element is obvious in light of Rofougaran itself, when combined with any of the other references as charted for this claim element in Exs. A-1–A-31, First Supplemental Ex. A-Obviousness Chart, and/or when combined with the knowledge of one of ordinary skill in the art. Motivations to combine may come from the knowledge of the person of ordinary skill themselves, or from the known problems and predictable solutions as embodied in these references. Further motivations to combine references and additional details may be found in the Cover Pleading and First Supplemental Ex. A-Obviousness Chart.

Claim 22 of the '802 Patent	Prior Art Reference – Rofougaran
[22.1] The communication system of claim 17	Rofougaran discloses all the elements of claim 17 for all the reasons provided above.
[22.2] wherein the second data corresponds to the first data and wherein the power amplifier outputs a third up-converted signal comprising the up-converted first analog signal and the up-converted second analog signal.	Rofougaran discloses "wherein the second data corresponds to the first data and wherein the power amplifier outputs a third up-converted signal comprising the up-converted first analog signal and the up-converted second analog signal." See, e.g.:  Figure 2 *See, e.g.*, Rofougaran at Figure 2.

Claim 22 of the ’802 Patent	Prior Art Reference – Rofougaran
	 Figure 5 *See, e.g.*, Rofougaran at Figure 5.

Claim 22 of the '802 Patent	Prior Art Reference – Rofougaran
	 Figure 7 *See, e.g.*, Rofougaran at Figure 7. FIG. 1 is a diagram showing a portion of a first non-limiting exemplary communication system 100, in accordance with various aspects of the present invention. The communication system (or device) may comprise characteristics of any of a variety of communication systems/devices (e.g., multimode wireless communication devices). For example and without limitation, the communication system may comprise characteristics of any of a variety of mobile wireless communication devices (e.g.,

Claim 22 of the ’802 Patent	Prior Art Reference – Rofougaran
	cellular phones, paging devices, portable email devices, etc.). Also for example, the communication system may comprise characteristics of fixed communication systems or devices (e.g., network access points, base stations, satellites, wireless routers, set top boxes, etc.). Further for example, the communication system may comprise characteristics of a variety of electronic devices with wireless communication capability (e.g., televisions, music players, cameras, remote controls, personal digital assistants, handheld computers, gaming devices, etc.). Accordingly, the scope of various aspects of the present invention should not be limited by characteristics of particular communication systems or devices. The following discussion will, at times, refer to various communication modes. A multimode communication device may, for example, be adapted to communicate in a plurality of such communication modes. For the following discussion, a communication mode may generally be considered to coincide with communication utilizing a particular communication protocol or standard. A non-limiting list of exemplary communication protocols includes various cellular communication protocols (e.g., GSM, GPRS, EDGE, CDMA, WCDMA, TDMA, PDC, etc.), various wireless networking protocols or standards, including WLAN, WMAN, WPAN and WWAN (e.g., IEEE 802.11, Bluetooth, IEEE 802.15, UWB, IEEE 802.16, IEEE 802.20, Zigbee, any WiFi protocol, etc.), various television communication standards, etc. The scope of various aspects of the present invention should not be limited by characteristics of particular communication modes or protocols, whether standard or proprietary. The exemplary communication system 100 may comprise at least a first input 101 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to any of the previously mentioned communication protocols. The exemplary communication system 100 may also comprise at least a second input 102 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first

Claim 22 of the '802 Patent	Prior Art Reference – Rofougaran
	communication protocol discussed above). For example and without limitation, the second baseband signal may correspond to any of the previously mentioned communication protocols. The first baseband signal and the second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of the communication system 100. For example, such modules may generate the first and second baseband signals independently (e.g., corresponding to independent respective communications). Alternatively, for example, such modules may generate the first and second baseband signals in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first and second baseband signals for a single communication). The exemplary communication system 100 may additionally comprise a spectral placement module 110 that is adapted to spectrally shift the first baseband signal (i.e., shift the frequency spectrum of the first baseband signal). In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to spectrally shift the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with the second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to implement a frequency-hopping scheme with the first baseband signal. For example, in a scenario, where there are one or more frequency bands (e.g., a second frequency space) associated with the second baseband signal, the spectral placement module 110 may be adapted to shift the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. *See, e.g.*, Rofougaran at 2:38-3:58. The exemplary communication system 100 may also comprise a second spectral placement module 120. Such a second spectral placement module 120 may, for example, share any or all characteristics

Claim 22 of the ’802 Patent	Prior Art Reference – Rofougaran
	with the spectral placement module 110 discussed previously. The incorporation of such a second spectral placement module 120 may, for example, provide spectral shifting flexibility. For example, in such an exemplary configuration, either or both of the first and second baseband signals may be spectrally shifted to substantially distinct frequency spaces. Also for example, in such an exemplary configuration, either or both of the first and second baseband signals may be frequency hopped. Note that though the second spectral placement module 120 is illustrated separate from the first spectral placement module 110, the second spectral placement module 120 may share any or all hardware and/or software components with the spectral placement module 110. The exemplary communication system 100 may further comprise a signal combiner 130 that is adapted to generate a composite signal comprising various input signals to the signal combiner 130. For example, the composite signal may simultaneously (i.e., at an instant in time) comprise components associated with various input signals. Note that such simultaneity need not always be present. For example, at a first instant in time, the signal output from the signal combiner 130 might comprise a plurality of components associated with a plurality of respective input signals, at a second instant in time, the signal output from the signal combiner 130 might comprise a single component associated with a single respective input signal, and at a third instant in time, the signal output from the signal combiner 130 might comprise no components. In a first non-limiting exemplary scenario, the signal combiner 130 may receive a first signal that is based on the first baseband signal (e.g., associated with a first communication protocol). Also, the signal combiner 130 may receive a second signal that is based on the second baseband signal (e.g., associated with a second communication protocol). In such a scenario, the signal combiner 130 may combine the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the first baseband signal and a second signal component based on the second baseband signal. In such a scenario, for example where the frequency spectra of the first and second baseband signals do not overlap, the first and second baseband signals might not be spectrally shifted prior to combining by the signal combiner 130. In such a scenario, the spectral placement module 110 (and optionally, the second spectral placement module 120) may receive a control signal indicating whether or not to perform spectral shifting and/or to what degree spectral shifting should be implemented.

Claim 22 of the ’802 Patent	Prior Art Reference – Rofougaran
	See, e.g., Rofougaran at 4:16-67. Various components of the exemplary communication system 100 (and other communication systems illustrated and discussed herein) may be implemented in analog and/or digital circuitry. To illustrate this, the exemplary communication system 100 is not shown with analog-to-digital converters (ADCs) or digital-to-analog converters (DACs). FIGS. 4-6, to be discussed later, show various non-limiting exemplary configurations including such converters. FIG. 2 is a diagram showing a portion of a second non-limiting exemplary communication system 200, in accordance with various aspects of the present invention. The communication system 200 may, for example and without limitation, share any or all characteristics with the communication system 100 illustrated in FIG. 1 and discussed previously. The exemplary communication system 200 may comprise at least a first input 201 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to the Bluetooth communication protocol. FIG. 2 shows an exemplary frequency spectrum 203 associated with the first baseband signal. The exemplary communication system 200 may also comprise at least a second input 202 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first communication protocol discussed above). For example and without limitation, the first baseband signal may correspond to an IEEE 802.11 communication protocol (e.g., IEEE 802.11(b) or IEEE 802.11(g)). FIG. 2 shows an exemplary frequency spectrum 204 associated with the second baseband signal. *See, e.g.*, Rofougaran at 5:64-6:31.

Claim 22 of the ’802 Patent	Prior Art Reference – Rofougaran
	In a non-limiting exemplary configuration illustrated in FIG. 2, the signal combiner 230 receives a first signal from the spectral placement module 210 that is based on the spectrally shifted first baseband signal. Also, the signal combiner 230 receives a second signal that is based on the second baseband signal. In such a configuration, the signal combiner 230 combines the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the spectrally shifted first baseband signal and a second signal component based on the second baseband signal (e.g., not spectrally shifted). FIG. 2 shows an exemplary frequency spectrum 231 associated with the composite signal formed by the signal combiner 230. The spectrum 231 comprises a first portion 233 corresponding to the first signal component, and a second portion 232 corresponding to the second signal component. Note that the first portion 233 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 232. The exemplary communication system 200 may also comprise an upconverter 240 adapted to upconvert a signal (e.g., the composite signal from the signal combiner 230) for transmission. The upconverter 240 may, for example and without limitation, share any or all characteristics with the upconverter 140 discussed previously. The upconverter 240 may, for example, comprise a mixer 247, a local oscillator 246 and one or more filters 248. The mixer 247 may, for example, receive the composite signal from the signal combiner 230 and an RF mixing signal at frequency fRF from a local oscillator 246. The upconverter 240 may, for example, filter the upconverted signal from the mixer 247 with one or more filters 248. The output of the upconverter 240 may, for example, comprise a signal indicative of the composite signal spectrally shifted to an RF frequency. FIG. 2 shows an exemplary frequency spectrum 241 associated with the RF signal formed by the upconverter 240. The frequency spectrum 241 comprises a first portion 243 corresponding to the first signal component and a second portion 242 corresponding to the second signal component. Note that the first portion 243 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 242. Also note that the first portion 243 and

Claim 22 of the ’802 Patent	Prior Art Reference – Rofougaran
	second portion 242 might be formed with a first mirror portion 244 and second mirror portion 245, respectively. Note that a mirror portion may either be removed or may be kept for later processing. The exemplary communication system 200 may further comprise a RF transmission stage 250 adapted to transmit an RF signal. The RF transmission stage 250 may, for example and without limitation, share any or all characteristics with the RF transmission stage 150 discussed previously. Such an RF signal may, for example, be associated with the composite signal output from the signal combiner 230 and upconverted by the upconverter 240. The RF transmission stage 250 may, for example and without limitation, comprise a power amplifier 252, antenna 254 and other components generally associated with RF signal transmission. *See, e.g.*, Rofougaran at 6:66-7:57. For example, the spectral placement module 510, optional second spectral placement module 520 and signal combiner 530 may operate in the analog domain. The first digital-to-analog converter 592 may convert the first baseband signal to the analog domain for processing by the spectral placement module 510. The second digital-to-analog converter 594 may convert the second baseband signal to the analog domain for processing by the second spectral placement module 520 or signal combiner 530. The signal combiner 530 then combines signals in the analog domain to generate an analog composite signal, which is then upconverted and transmitted by the upconverter 540 and RF transmission stage 550, respectively. *See, e.g.*, Rofougaran at 9:30-41. FIG. 7 is a diagram showing a portion of a seventh non-limiting exemplary communication system 700, in accordance with various aspects of the present invention. The exemplary communication system 700 may, for example and without limitation, share any or all characteristics with the exemplary systems 100-600 illustrated in FIGS. 1-6 and discussed previously. The exemplary communication system 700 may comprise a first mixer 744 that receives a spectrally shifted first baseband signal from the spectral placement module 710 and a first RF mixing signal (e.g., a 2.446 GHz signal generally associated with the Bluetooth communication protocol) from a

Claim 22 of the '802 Patent	Prior Art Reference – Rofougaran
	first local oscillator 742. The exemplary communication system 700 may also comprise a second mixer 748 that receives a second baseband signal (or a spectrally shifted second baseband signal) and a second RF mixing signal (e.g., a 2.486 GHz signal generally associated with the IEEE 802.11(g) communication protocol) from a second local oscillator 746. The exemplary communication system 700 may comprise an RF signal combiner 730 that is adapted to combine input RF signals. The RF signal combiner 730 may, for example, receive and combine the output signals from the first mixer 744 and second mixer 748 to generate an RF composite signal. The exemplary communication system 700 may also comprise a RF transmission stage 750 that receives the RF composite signal from the RF signal combiner 730 and transmit the signal. *See*, *e.g.*, Rofougaran at 10:18-43. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 810 comprises receiving the first baseband signal, step 810 may comprise receiving the first baseband signal in any manner generally associated with receiving a baseband signal. The first baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 810 may, for example, comprise generating the first baseband signal independently (e.g., corresponding to an independent communication). Step 810 may alternatively, for example, comprise generating the first baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first baseband signal and other baseband signals for a single communication). The exemplary method 800 may, at step 820, comprise spectrally placing (or shifting) the first baseband signal (e.g., received at step 810). Step 820 may, for example and without limitation, share any or all functional characteristics with the spectral placement modules 110-710 of the exemplary systems 100-700 illustrated in FIGS. 1-7 and discussed previously.

Claim 22 of the ’802 Patent	Prior Art Reference – Rofougaran
	Step 820 may, for example, comprise spectrally shifting the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with a second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, step 820 may comprise implementing a frequency-hopping scheme with the first baseband signal. For example, in a scenario where there are one or more frequency bands (e.g., a second frequency space) associated with a second baseband signal, step 820 may comprise spectrally shifting the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. In another non-limiting exemplary scenario, spectrally shifting the first baseband signal may result in the production of a spectral image (e.g., frequency content mirrored about a mixing frequency utilized to spectrally shift the first baseband signal). In such a scenario, step 820 may comprise accepting or rejecting the image. In a scenario where an image is rejected, step 820 may comprise rejecting the image in any of a variety of manners. For example and without limitation, step 820 may comprise performing image reject mixing to spectrally shift the first baseband signal. Such image reject mixing generally comprises spectrally shifting a signal and rejecting an image associated with the spectrally shifted signal. Also for example, step 820 may comprise filtering out an unwanted image. The scope of various aspects of the present invention should not be limited by the utilization of image rejection or by any particular manner of performing such image rejection. The exemplary method 800 may, at step 830, comprise generating and/or receiving a second baseband signal corresponding to a second communication protocol (e.g., different from the first communication protocol). Step 830 may, for example and without limitation, share any or all functional characteristics with the second input 102 of the exemplary system 100 illustrated in FIG. 1 and discussed previously.

Claim 22 of the ’802 Patent	Prior Art Reference – Rofougaran
	The second baseband signal may, for example, correspond to a second communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 830 comprises receiving the second baseband signal, step 830 may comprise receiving the second baseband signal in any manner generally associated with receiving a baseband signal. The second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 830 may, for example, comprise generating the second baseband signal independently (e.g., corresponding to a communication independent of a communication associated with the first baseband signal). Step 830 may alternatively, for example, comprise generating the second baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the second baseband signal and the first baseband signal for a single communication). *See*, *e.g.*, Rofougaran at 11:53-13:4. Furthermore, this claim element is obvious in light of Rofougaran itself, when combined with any of the other references as charted for this claim element in Exs. A-1–A-31, First Supplemental Ex. A-Obviousness Chart, and/or when combined with the knowledge of one of ordinary skill in the art. Motivations to combine may come from the knowledge of the person of ordinary skill themselves, or from the known problems and predictable solutions as embodied in these references. Further motivations to combine references and additional details may be found in the Cover Pleading and First Supplemental Ex. A-Obviousness Chart.

Claim 23 of the ’802 Patent	Prior Art Reference – Rofougaran
[23.1] The communication system of claim 17	Rofougaran discloses all the elements of claim 17 for all the reasons provided above.
[23.2] wherein first and second data to be transmitted comprise a plurality of OFDM	Rofougaran discloses “wherein first and second data to be transmitted comprise a plurality of OFDM symbols, wherein a first symbol is transmitted during a first time slot across the first up-converted frequency range and a second symbol is transmitted during the first time slot across the second up-

Claim 23 of the '802 Patent	Prior Art Reference – Rofougaran
symbols, wherein a first symbol is transmitted during a first time slot across the first up-converted frequency range and a second symbol is transmitted during the first time slot across the second up-converted frequency range, and wherein a third symbol is transmitted during a second time slot across the first up-converted frequency range and a fourth symbol is transmitted during the second time slot across a second up-converted frequency range.	converted frequency range, and wherein a third symbol is transmitted during a second time slot across the first up-converted frequency range and a fourth symbol is transmitted during the second time slot across a second up-converted frequency range." See, e.g.: FIG. 1 is a diagram showing a portion of a first non-limiting exemplary communication system 100, in accordance with various aspects of the present invention. The communication system (or device) may comprise characteristics of any of a variety of communication systems/devices (e.g., multimode wireless communication devices). For example and without limitation, the communication system may comprise characteristics of any of a variety of mobile wireless communication devices (e.g., cellular phones, paging devices, portable email devices, etc.). Also for example, the communication system may comprise characteristics of fixed communication systems or devices (e.g., network access points, base stations, satellites, wireless routers, set top boxes, etc.). Further for example, the communication system may comprise characteristics of a variety of electronic devices with wireless communication capability (e.g., televisions, music players, cameras, remote controls, personal digital assistants, handheld computers, gaming devices, etc.). Accordingly, the scope of various aspects of the present invention should not be limited by characteristics of particular communication systems or devices. The following discussion will, at times, refer to various communication modes. A multimode communication device may, for example, be adapted to communicate in a plurality of such communication modes. For the following discussion, a communication mode may generally be considered to coincide with communication utilizing a particular communication protocol or standard. A non-limiting list of exemplary communication protocols includes various cellular communication protocols (e.g., GSM, GPRS, EDGE, CDMA, WCDMA, TDMA, PDC, etc.), various wireless networking protocols or standards, including WLAN, WMAN, WPAN and WWAN (e.g., IEEE 802.11, Bluetooth, IEEE 802.15, UWB, IEEE 802.16, IEEE 802.20, Zigbee, any WiFi protocol, etc.), various television communication standards, etc. The scope of various aspects of the present invention should not be limited by characteristics of particular communication modes or protocols, whether standard or proprietary.

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	The exemplary communication system 100 may comprise at least a first input 101 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to any of the previously mentioned communication protocols. The exemplary communication system 100 may also comprise at least a second input 102 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first communication protocol discussed above). For example and without limitation, the second baseband signal may correspond to any of the previously mentioned communication protocols. The first baseband signal and the second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of the communication system 100. For example, such modules may generate the first and second baseband signals independently (e.g., corresponding to independent respective communications). Alternatively, for example, such modules may generate the first and second baseband signals in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first and second baseband signals for a single communication). The exemplary communication system 100 may additionally comprise a spectral placement module 110 that is adapted to spectrally shift the first baseband signal (i.e., shift the frequency spectrum of the first baseband signal). In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to spectrally shift the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with the second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to implement a frequency-hopping scheme with the first baseband signal. For example, in a scenario,

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	where there are one or more frequency bands (e.g., a second frequency space) associated with the second baseband signal, the spectral placement module 110 may be adapted to shift the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. *See, e.g.*, Rofougaran at 2:38-3:58. The exemplary communication system 100 may also comprise a second spectral placement module 120. Such a second spectral placement module 120 may, for example, share any or all characteristics with the spectral placement module 110 discussed previously. The incorporation of such a second spectral placement module 120 may, for example, provide spectral shifting flexibility. For example, in such an exemplary configuration, either or both of the first and second baseband signals may be spectrally shifted to substantially distinct frequency spaces. Also for example, in such an exemplary configuration, either or both of the first and second baseband signals may be frequency hopped. Note that though the second spectral placement module 120 is illustrated separate from the first spectral placement module 110, the second spectral placement module 120 may share any or all hardware and/or software components with the spectral placement module 110. The exemplary communication system 100 may further comprise a signal combiner 130 that is adapted to generate a composite signal comprising various input signals to the signal combiner 130. For example, the composite signal may simultaneously (i.e., at an instant in time) comprise components associated with various input signals. Note that such simultaneity need not always be present. For example, at a first instant in time, the signal output from the signal combiner 130 might comprise a plurality of components associated with a plurality of respective input signals, at a second instant in time, the signal output from the signal combiner 130 might comprise a single component associated with a single respective input signal, and at a third instant in time, the signal output from the signal combiner 130 might comprise no components. In a first non-limiting exemplary scenario, the signal combiner 130 may receive a first signal that is based on the first baseband signal (e.g., associated with a first communication protocol). Also, the signal combiner 130 may receive a second signal that is based on the second baseband signal (e.g.,

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	associated with a second communication protocol). In such a scenario, the signal combiner 130 may combine the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the first baseband signal and a second signal component based on the second baseband signal. In such a scenario, for example where the frequency spectra of the first and second baseband signals do not overlap, the first and second baseband signals might not be spectrally shifted prior to combining by the signal combiner 130. In such a scenario, the spectral placement module 110 (and optionally, the second spectral placement module 120) may receive a control signal indicating whether or not to perform spectral shifting and/or to what degree spectral shifting should be implemented. *See, e.g.*, Rofougaran at 4:16-67. Various components of the exemplary communication system 100 (and other communication systems illustrated and discussed herein) may be implemented in analog and/or digital circuitry. To illustrate this, the exemplary communication system 100 is not shown with analog-to-digital converters (ADCs) or digital-to-analog converters (DACs). FIGS. 4-6, to be discussed later, show various non-limiting exemplary configurations including such converters. FIG. 2 is a diagram showing a portion of a second non-limiting exemplary communication system 200, in accordance with various aspects of the present invention. The communication system 200 may, for example and without limitation, share any or all characteristics with the communication system 100 illustrated in FIG. 1 and discussed previously. The exemplary communication system 200 may comprise at least a first input 201 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to the Bluetooth communication protocol. FIG. 2 shows an exemplary frequency spectrum 203 associated with the first baseband signal.

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	The exemplary communication system 200 may also comprise at least a second input 202 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first communication protocol discussed above). For example and without limitation, the first baseband signal may correspond to an IEEE 802.11 communication protocol (e.g., IEEE 802.11(b) or IEEE 802.11(g)). FIG. 2 shows an exemplary frequency spectrum 204 associated with the second baseband signal. *See, e.g.*, Rofougaran at 5:64-6:31. In a non-limiting exemplary configuration illustrated in FIG. 2, the signal combiner 230 receives a first signal from the spectral placement module 210 that is based on the spectrally shifted first baseband signal. Also, the signal combiner 230 receives a second signal that is based on the second baseband signal. In such a configuration, the signal combiner 230 combines the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the spectrally shifted first baseband signal and a second signal component based on the second baseband signal (e.g., not spectrally shifted). FIG. 2 shows an exemplary frequency spectrum 231 associated with the composite signal formed by the signal combiner 230. The spectrum 231 comprises a first portion 233 corresponding to the first signal component, and a second portion 232 corresponding to the second signal component. Note that the first portion 233 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 232. The exemplary communication system 200 may also comprise an upconverter 240 adapted to upconvert a signal (e.g., the composite signal from the signal combiner 230) for transmission. The upconverter 240 may, for example and without limitation, share any or all characteristics with the upconverter 140 discussed previously. The upconverter 240 may, for example, comprise a mixer 247, a local oscillator 246 and one or more filters 248. The mixer 247 may, for example, receive the composite signal from the signal combiner

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	230 and an RF mixing signal at frequency fRF from a local oscillator 246. The upconverter 240 may, for example, filter the upconverted signal from the mixer 247 with one or more filters 248. The output of the upconverter 240 may, for example, comprise a signal indicative of the composite signal spectrally shifted to an RF frequency. FIG. 2 shows an exemplary frequency spectrum 241 associated with the RF signal formed by the upconverter 240. The frequency spectrum 241 comprises a first portion 243 corresponding to the first signal component and a second portion 242 corresponding to the second signal component. Note that the first portion 243 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 242. Also note that the first portion 243 and second portion 242 might be formed with a first mirror portion 244 and second mirror portion 245, respectively. Note that a mirror portion may either be removed or may be kept for later processing. The exemplary communication system 200 may further comprise a RF transmission stage 250 adapted to transmit an RF signal. The RF transmission stage 250 may, for example and without limitation, share any or all characteristics with the RF transmission stage 150 discussed previously. Such an RF signal may, for example, be associated with the composite signal output from the signal combiner 230 and upconverted by the upconverter 240. The RF transmission stage 250 may, for example and without limitation, comprise a power amplifier 252, antenna 254 and other components generally associated with RF signal transmission. *See, e.g.*, Rofougaran at 6:66-7:57. For example, the spectral placement module 510, optional second spectral placement module 520 and signal combiner 530 may operate in the analog domain. The first digital-to-analog converter 592 may convert the first baseband signal to the analog domain for processing by the spectral placement module 510. The second digital-to-analog converter 594 may convert the second baseband signal to the analog domain for processing by the second spectral placement module 520 or signal combiner 530. The signal combiner 530 then combines signals in the analog domain to generate an analog composite signal, which is then upconverted and transmitted by the upconverter 540 and RF transmission stage 550, respectively.

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	See, e.g., Rofougaran at 9:30-41. FIG. 7 is a diagram showing a portion of a seventh non-limiting exemplary communication system 700, in accordance with various aspects of the present invention. The exemplary communication system 700 may, for example and without limitation, share any or all characteristics with the exemplary systems 100-600 illustrated in FIGS. 1-6 and discussed previously. The exemplary communication system 700 may comprise a first mixer 744 that receives a spectrally shifted first baseband signal from the spectral placement module 710 and a first RF mixing signal (e.g., a 2.446 GHz signal generally associated with the Bluetooth communication protocol) from a first local oscillator 742. The exemplary communication system 700 may also comprise a second mixer 748 that receives a second baseband signal (or a spectrally shifted second baseband signal) and a second RF mixing signal (e.g., a 2.486 GHz signal generally associated with the IEEE 802.11(g) communication protocol) from a second local oscillator 746. The exemplary communication system 700 may comprise an RF signal combiner 730 that is adapted to combine input RF signals. The RF signal combiner 730 may, for example, receive and combine the output signals from the first mixer 744 and second mixer 748 to generate an RF composite signal. The exemplary communication system 700 may also comprise a RF transmission stage 750 that receives the RF composite signal from the RF signal combiner 730 and transmit the signal. *See, e.g.*, Rofougaran at 10:18-43. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 810 comprises receiving the first baseband signal, step 810 may comprise receiving the first baseband signal in any manner generally associated with receiving a baseband signal. The first baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 810 may, for example, comprise generating the first baseband signal independently (e.g.,

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	corresponding to an independent communication). Step 810 may alternatively, for example, comprise generating the first baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first baseband signal and other baseband signals for a single communication). The exemplary method 800 may, at step 820, comprise spectrally placing (or shifting) the first baseband signal (e.g., received at step 810). Step 820 may, for example and without limitation, share any or all functional characteristics with the spectral placement modules 110-710 of the exemplary systems 100-700 illustrated in FIGS. 1-7 and discussed previously. Step 820 may, for example, comprise spectrally shifting the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with a second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, step 820 may comprise implementing a frequency-hopping scheme with the first baseband signal. For example, in a scenario where there are one or more frequency bands (e.g., a second frequency space) associated with a second baseband signal, step 820 may comprise spectrally shifting the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. In another non-limiting exemplary scenario, spectrally shifting the first baseband signal may result in the production of a spectral image (e.g., frequency content mirrored about a mixing frequency utilized to spectrally shift the first baseband signal). In such a scenario, step 820 may comprise accepting or rejecting the image. In a scenario where an image is rejected, step 820 may comprise rejecting the image in any of a variety of manners. For example and without limitation, step 820 may comprise performing image reject mixing to spectrally shift the first baseband signal. Such image reject mixing generally

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	comprises spectrally shifting a signal and rejecting an image associated with the spectrally shifted signal. Also for example, step 820 may comprise filtering out an unwanted image. The scope of various aspects of the present invention should not be limited by the utilization of image rejection or by any particular manner of performing such image rejection. The exemplary method 800 may, at step 830, comprise generating and/or receiving a second baseband signal corresponding to a second communication protocol (e.g., different from the first communication protocol). Step 830 may, for example and without limitation, share any or all functional characteristics with the second input 102 of the exemplary system 100 illustrated in FIG. 1 and discussed previously. The second baseband signal may, for example, correspond to a second communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 830 comprises receiving the second baseband signal, step 830 may comprise receiving the second baseband signal in any manner generally associated with receiving a baseband signal. The second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 830 may, for example, comprise generating the second baseband signal independently (e.g., corresponding to a communication independent of a communication associated with the first baseband signal). Step 830 may alternatively, for example, comprise generating the second baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the second baseband signal and the first baseband signal for a single communication). *See, e.g.*, Rofougaran at 11:53-13:4. Furthermore, this claim element is obvious in light of Rofougaran itself, when combined with any of the other references as charted for this claim element in Exs. A-1–A-31, First Supplemental Ex. A-Obviousness Chart, and/or when combined with the knowledge of one of ordinary skill in the art. Motivations to combine may come from the knowledge of the person of ordinary skill themselves, or from the known problems and predictable solutions as embodied in these references. Further

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	motivations to combine references and additional details may be found in the Cover Pleading and First Supplemental Ex. A-Obviousness Chart.

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[24.1] An electronic circuit comprising:	To the extent the preamble is limiting, Rofougaran discloses "An electronic circuit comprising." See, e.g.: FIG. 1 is a diagram showing a portion of a first non-limiting exemplary communication system 100, in accordance with various aspects of the present invention. The communication system (or device) may comprise characteristics of any of a variety of communication systems/devices (e.g., multimode wireless communication devices). For example and without limitation, the communication system may comprise characteristics of any of a variety of mobile wireless communication devices (e.g., cellular phones, paging devices, portable email devices, etc.). Also for example, the communication system may comprise characteristics of fixed communication systems or devices (e.g., network access points, base stations, satellites, wireless routers, set top boxes, etc.). Further for example, the communication system may comprise characteristics of a variety of electronic devices with wireless communication capability (e.g., televisions, music players, cameras, remote controls, personal digital assistants, handheld computers, gaming devices, etc.). Accordingly, the scope of various aspects of the present invention should not be limited by characteristics of particular communication systems or devices. The following discussion will, at times, refer to various communication modes. A multimode communication device may, for example, be adapted to communicate in a plurality of such communication modes. For the following discussion, a communication mode may generally be considered to coincide with communication utilizing a particular communication protocol or standard. A non-limiting list of exemplary communication protocols includes various cellular communication protocols (e.g., GSM, GPRS, EDGE, CDMA, WCDMA, TDMA, PDC, etc.), various wireless networking protocols or standards, including WLAN, WMAN, WPAN and WWAN (e.g., IEEE 802.11, Bluetooth, IEEE 802.15, UWB, IEEE 802.16, IEEE 802.20, Zigbee, any WiFi protocol,

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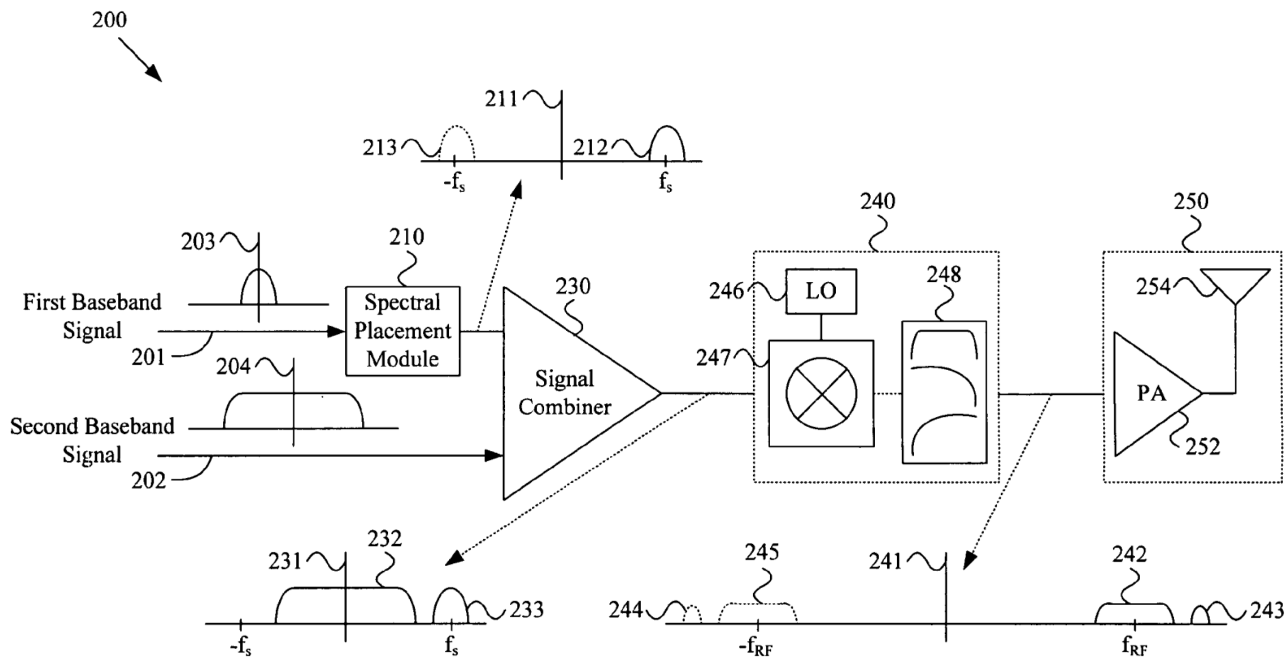
	etc.), various television communication standards, etc. The scope of various aspects of the present invention should not be limited by characteristics of particular communication modes or protocols, whether standard or proprietary. *See*, *e.g.*, Rofougaran at 2:36-3:6.  Figure 2 *See*, *e.g.*, Rofougaran at Figure 2.

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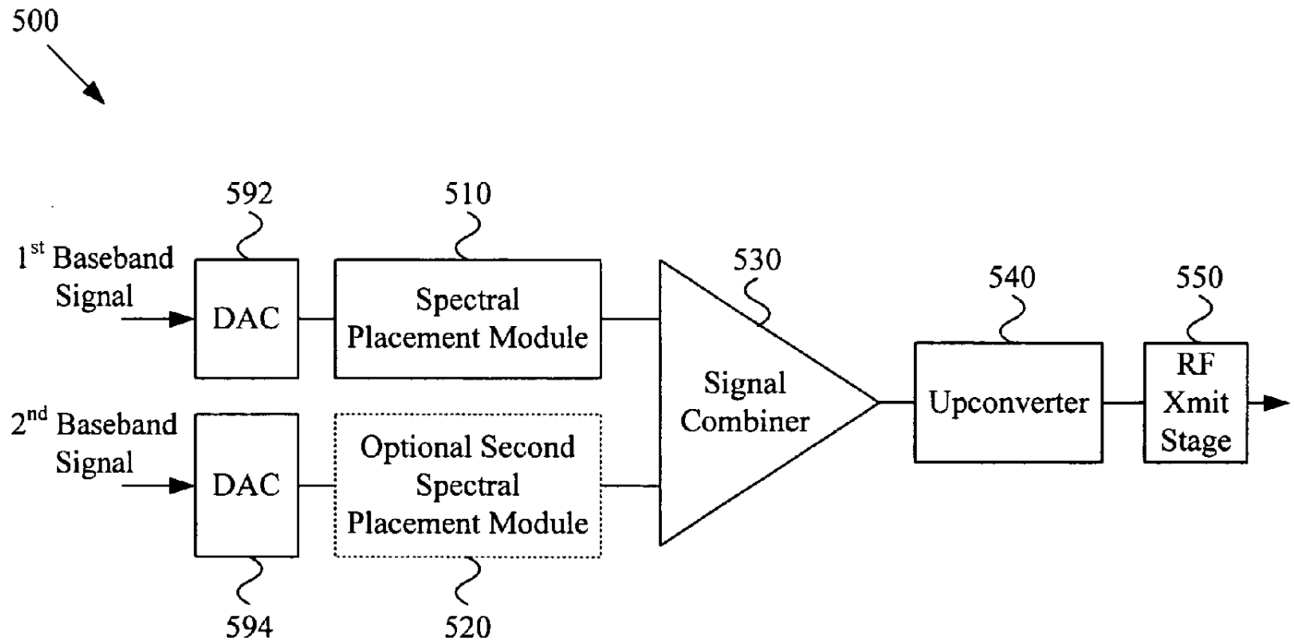
	 Figure 5 *See, e.g.*, Rofougaran at Figure 5.

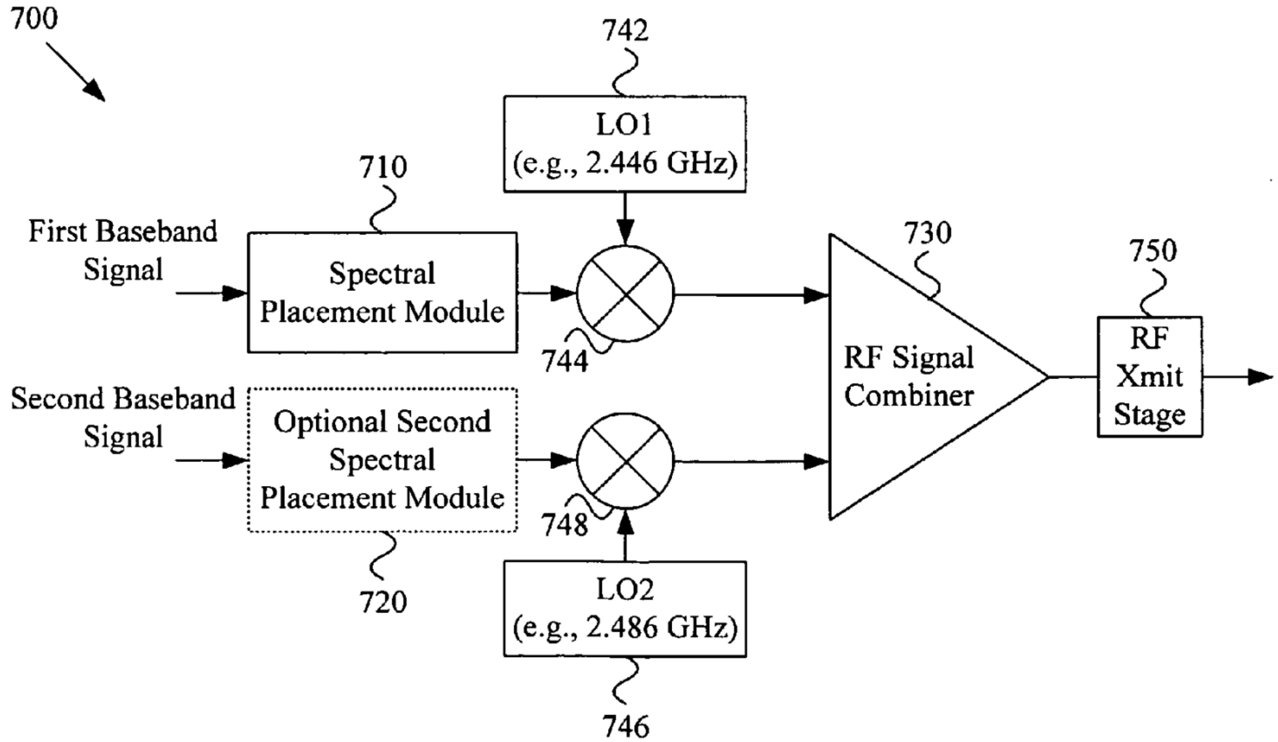
<table>
<tr><th>Claim 24 of the ’802 Patent</th><th>Prior Art Reference – Rofougaran</th></tr>
<tr><td></td><td>


Figure 7

See, e.g., Rofougaran at Figure 7.

Furthermore, this claim element is obvious in light of Rofougaran itself, when combined with any of the other references as charted for this claim element in Exs. A-1–A-31, First Supplemental Ex. A-Obviousness Chart, and/or when combined with the knowledge of one of ordinary skill in the art. Motivations to combine may come from the knowledge of the person of ordinary skill themselves, or from the known problems and predictable solutions as embodied in these references. Further
</td></tr>
</table>

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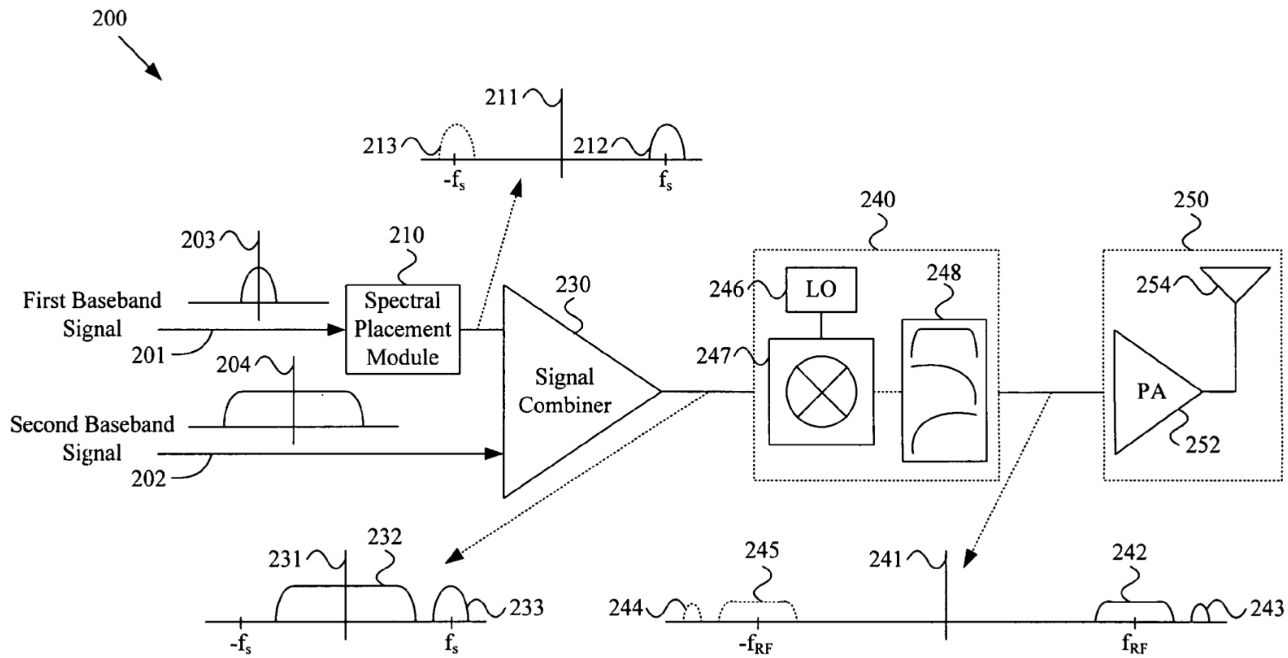
	motivations to combine references and additional details may be found in the Cover Pleading and First Supplemental Ex. A-Obviousness Chart.
[24.2] a first down-converter circuit having a first input coupled to receive a first up-converted signal, a second input coupled to receive a first demodulation signal having a first RF frequency, and an output, wherein the first down-converter circuit outputs a first down-converted signal on the first down-converter output;	Rofougaran discloses "a first down-converter circuit having a first input coupled to receive a first up-converted signal, a second input coupled to receive a first demodulation signal having a first RF frequency, and an output, wherein the first down-converter circuit outputs a first down-converted signal on the first down-converter output." See, e.g.:  Figure 2 *See, e.g.*, Rofougaran at Figure 2.

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	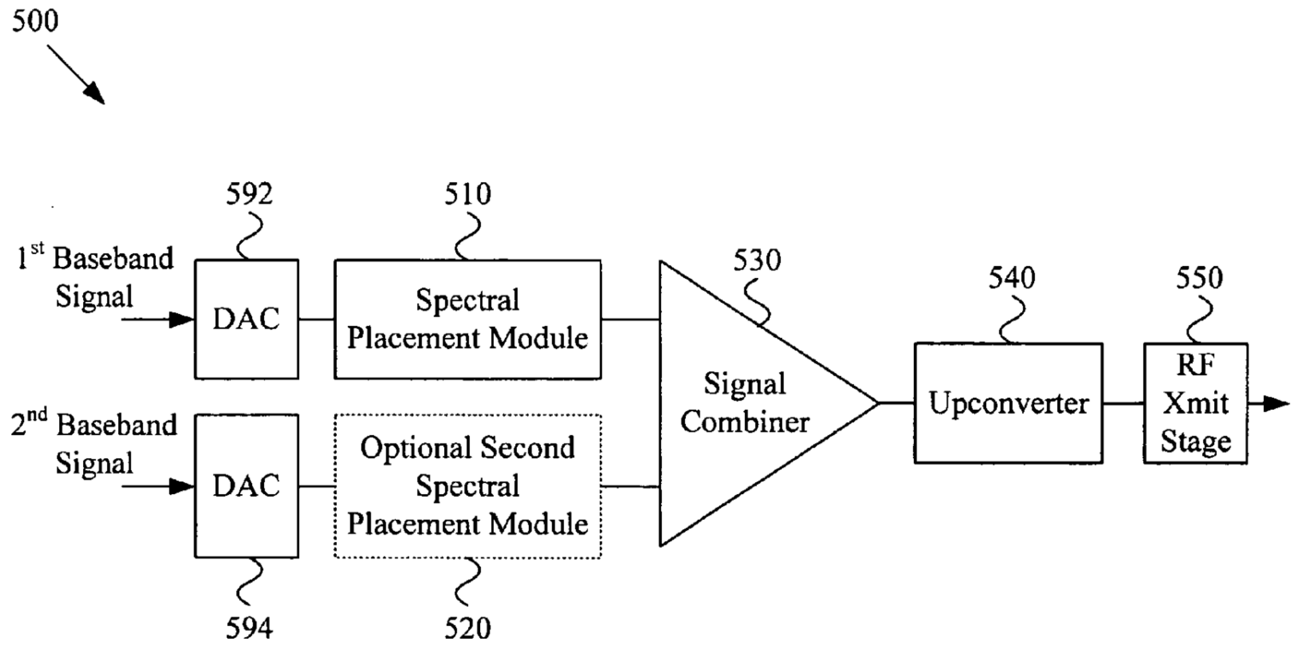 Figure 5 *See, e.g.*, Rofougaran at Figure 5.

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	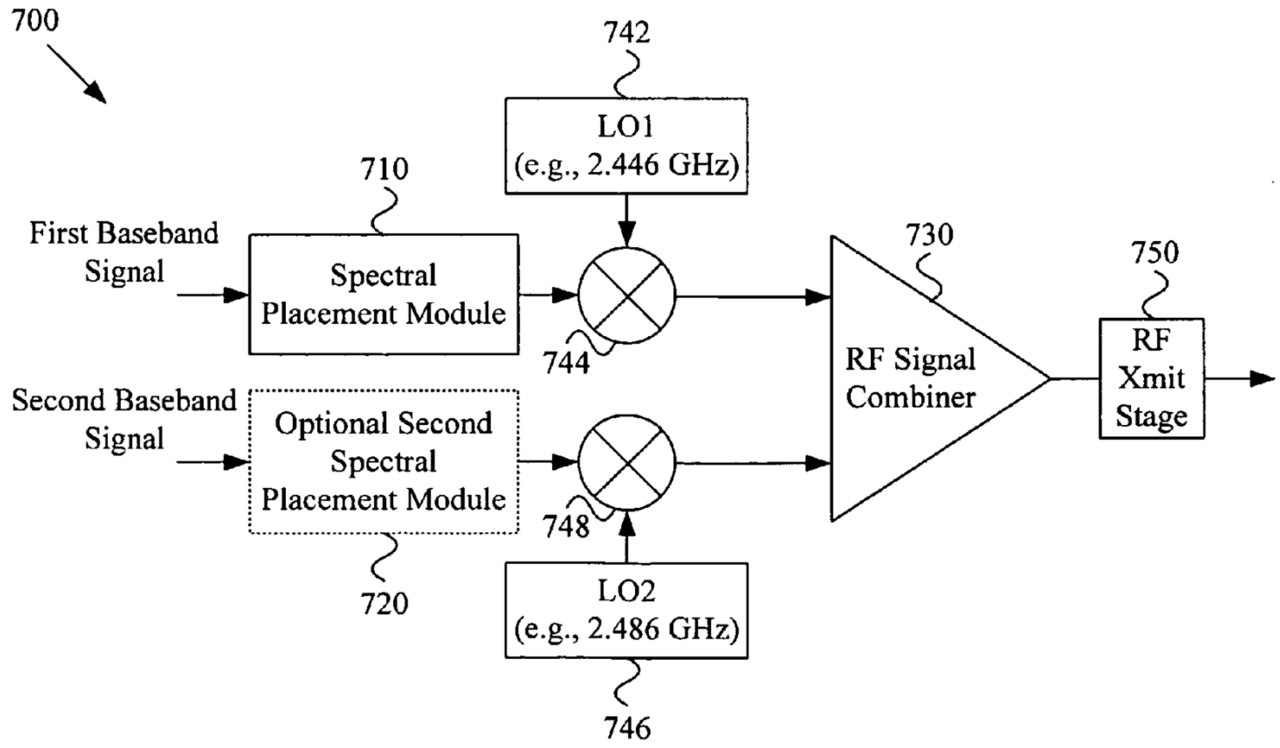 Figure 7 *See, e.g.*, Rofougaran at Figure 7. FIG. 1 is a diagram showing a portion of a first non-limiting exemplary communication system 100, in accordance with various aspects of the present invention. The communication system (or device) may comprise characteristics of any of a variety of communication systems/devices (e.g., multimode wireless communication devices). For example and without limitation, the communication system may comprise characteristics of any of a variety of mobile wireless communication devices (e.g.,

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	cellular phones, paging devices, portable email devices, etc.). Also for example, the communication system may comprise characteristics of fixed communication systems or devices (e.g., network access points, base stations, satellites, wireless routers, set top boxes, etc.). Further for example, the communication system may comprise characteristics of a variety of electronic devices with wireless communication capability (e.g., televisions, music players, cameras, remote controls, personal digital assistants, handheld computers, gaming devices, etc.). Accordingly, the scope of various aspects of the present invention should not be limited by characteristics of particular communication systems or devices. The following discussion will, at times, refer to various communication modes. A multimode communication device may, for example, be adapted to communicate in a plurality of such communication modes. For the following discussion, a communication mode may generally be considered to coincide with communication utilizing a particular communication protocol or standard. A non-limiting list of exemplary communication protocols includes various cellular communication protocols (e.g., GSM, GPRS, EDGE, CDMA, WCDMA, TDMA, PDC, etc.), various wireless networking protocols or standards, including WLAN, WMAN, WPAN and WWAN (e.g., IEEE 802.11, Bluetooth, IEEE 802.15, UWB, IEEE 802.16, IEEE 802.20, Zigbee, any WiFi protocol, etc.), various television communication standards, etc. The scope of various aspects of the present invention should not be limited by characteristics of particular communication modes or protocols, whether standard or proprietary. The exemplary communication system 100 may comprise at least a first input 101 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to any of the previously mentioned communication protocols. The exemplary communication system 100 may also comprise at least a second input 102 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first

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	communication protocol discussed above). For example and without limitation, the second baseband signal may correspond to any of the previously mentioned communication protocols. The first baseband signal and the second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of the communication system 100. For example, such modules may generate the first and second baseband signals independently (e.g., corresponding to independent respective communications). Alternatively, for example, such modules may generate the first and second baseband signals in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first and second baseband signals for a single communication). The exemplary communication system 100 may additionally comprise a spectral placement module 110 that is adapted to spectrally shift the first baseband signal (i.e., shift the frequency spectrum of the first baseband signal). In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to spectrally shift the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with the second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to implement a frequency-hopping scheme with the first baseband signal. For example, in a scenario, where there are one or more frequency bands (e.g., a second frequency space) associated with the second baseband signal, the spectral placement module 110 may be adapted to shift the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. *See, e.g.*, Rofougaran at 2:38-3:58. The exemplary communication system 100 may also comprise a second spectral placement module 120. Such a second spectral placement module 120 may, for example, share any or all characteristics

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	with the spectral placement module 110 discussed previously. The incorporation of such a second spectral placement module 120 may, for example, provide spectral shifting flexibility. For example, in such an exemplary configuration, either or both of the first and second baseband signals may be spectrally shifted to substantially distinct frequency spaces. Also for example, in such an exemplary configuration, either or both of the first and second baseband signals may be frequency hopped. Note that though the second spectral placement module 120 is illustrated separate from the first spectral placement module 110, the second spectral placement module 120 may share any or all hardware and/or software components with the spectral placement module 110. The exemplary communication system 100 may further comprise a signal combiner 130 that is adapted to generate a composite signal comprising various input signals to the signal combiner 130. For example, the composite signal may simultaneously (i.e., at an instant in time) comprise components associated with various input signals. Note that such simultaneity need not always be present. For example, at a first instant in time, the signal output from the signal combiner 130 might comprise a plurality of components associated with a plurality of respective input signals, at a second instant in time, the signal output from the signal combiner 130 might comprise a single component associated with a single respective input signal, and at a third instant in time, the signal output from the signal combiner 130 might comprise no components. In a first non-limiting exemplary scenario, the signal combiner 130 may receive a first signal that is based on the first baseband signal (e.g., associated with a first communication protocol). Also, the signal combiner 130 may receive a second signal that is based on the second baseband signal (e.g., associated with a second communication protocol). In such a scenario, the signal combiner 130 may combine the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the first baseband signal and a second signal component based on the second baseband signal. In such a scenario, for example where the frequency spectra of the first and second baseband signals do not overlap, the first and second baseband signals might not be spectrally shifted prior to combining by the signal combiner 130. In such a scenario, the spectral placement module 110 (and optionally, the second spectral placement module 120) may receive a control signal indicating whether or not to perform spectral shifting and/or to what degree spectral shifting should be implemented.

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	See, e.g., Rofougaran at 4:16-67. Various components of the exemplary communication system 100 (and other communication systems illustrated and discussed herein) may be implemented in analog and/or digital circuitry. To illustrate this, the exemplary communication system 100 is not shown with analog-to-digital converters (ADCs) or digital-to-analog converters (DACs). FIGS. 4-6, to be discussed later, show various non-limiting exemplary configurations including such converters. FIG. 2 is a diagram showing a portion of a second non-limiting exemplary communication system 200, in accordance with various aspects of the present invention. The communication system 200 may, for example and without limitation, share any or all characteristics with the communication system 100 illustrated in FIG. 1 and discussed previously. The exemplary communication system 200 may comprise at least a first input 201 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to the Bluetooth communication protocol. FIG. 2 shows an exemplary frequency spectrum 203 associated with the first baseband signal. The exemplary communication system 200 may also comprise at least a second input 202 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first communication protocol discussed above). For example and without limitation, the first baseband signal may correspond to an IEEE 802.11 communication protocol (e.g., IEEE 802.11(b) or IEEE 802.11(g)). FIG. 2 shows an exemplary frequency spectrum 204 associated with the second baseband signal. *See, e.g.*, Rofougaran at 5:64-6:31.

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	In a non-limiting exemplary configuration illustrated in FIG. 2, the signal combiner 230 receives a first signal from the spectral placement module 210 that is based on the spectrally shifted first baseband signal. Also, the signal combiner 230 receives a second signal that is based on the second baseband signal. In such a configuration, the signal combiner 230 combines the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the spectrally shifted first baseband signal and a second signal component based on the second baseband signal (e.g., not spectrally shifted). FIG. 2 shows an exemplary frequency spectrum 231 associated with the composite signal formed by the signal combiner 230. The spectrum 231 comprises a first portion 233 corresponding to the first signal component, and a second portion 232 corresponding to the second signal component. Note that the first portion 233 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 232. The exemplary communication system 200 may also comprise an upconverter 240 adapted to upconvert a signal (e.g., the composite signal from the signal combiner 230) for transmission. The upconverter 240 may, for example and without limitation, share any or all characteristics with the upconverter 140 discussed previously. The upconverter 240 may, for example, comprise a mixer 247, a local oscillator 246 and one or more filters 248. The mixer 247 may, for example, receive the composite signal from the signal combiner 230 and an RF mixing signal at frequency fRF from a local oscillator 246. The upconverter 240 may, for example, filter the upconverted signal from the mixer 247 with one or more filters 248. The output of the upconverter 240 may, for example, comprise a signal indicative of the composite signal spectrally shifted to an RF frequency. FIG. 2 shows an exemplary frequency spectrum 241 associated with the RF signal formed by the upconverter 240. The frequency spectrum 241 comprises a first portion 243 corresponding to the first signal component and a second portion 242 corresponding to the second signal component. Note that the first portion 243 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 242. Also note that the first portion 243 and

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	second portion 242 might be formed with a first mirror portion 244 and second mirror portion 245, respectively. Note that a mirror portion may either be removed or may be kept for later processing. The exemplary communication system 200 may further comprise a RF transmission stage 250 adapted to transmit an RF signal. The RF transmission stage 250 may, for example and without limitation, share any or all characteristics with the RF transmission stage 150 discussed previously. Such an RF signal may, for example, be associated with the composite signal output from the signal combiner 230 and upconverted by the upconverter 240. The RF transmission stage 250 may, for example and without limitation, comprise a power amplifier 252, antenna 254 and other components generally associated with RF signal transmission. *See, e.g.*, Rofougaran at 6:66-7:57. For example, the spectral placement module 510, optional second spectral placement module 520 and signal combiner 530 may operate in the analog domain. The first digital-to-analog converter 592 may convert the first baseband signal to the analog domain for processing by the spectral placement module 510. The second digital-to-analog converter 594 may convert the second baseband signal to the analog domain for processing by the second spectral placement module 520 or signal combiner 530. The signal combiner 530 then combines signals in the analog domain to generate an analog composite signal, which is then upconverted and transmitted by the upconverter 540 and RF transmission stage 550, respectively. *See, e.g.*, Rofougaran at 9:30-41. FIG. 7 is a diagram showing a portion of a seventh non-limiting exemplary communication system 700, in accordance with various aspects of the present invention. The exemplary communication system 700 may, for example and without limitation, share any or all characteristics with the exemplary systems 100-600 illustrated in FIGS. 1-6 and discussed previously. The exemplary communication system 700 may comprise a first mixer 744 that receives a spectrally shifted first baseband signal from the spectral placement module 710 and a first RF mixing signal (e.g., a 2.446 GHz signal generally associated with the Bluetooth communication protocol) from a

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	first local oscillator 742. The exemplary communication system 700 may also comprise a second mixer 748 that receives a second baseband signal (or a spectrally shifted second baseband signal) and a second RF mixing signal (e.g., a 2.486 GHz signal generally associated with the IEEE 802.11(g) communication protocol) from a second local oscillator 746. The exemplary communication system 700 may comprise an RF signal combiner 730 that is adapted to combine input RF signals. The RF signal combiner 730 may, for example, receive and combine the output signals from the first mixer 744 and second mixer 748 to generate an RF composite signal. The exemplary communication system 700 may also comprise a RF transmission stage 750 that receives the RF composite signal from the RF signal combiner 730 and transmit the signal. *See*, *e.g.*, Rofougaran at 10:18-43. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 810 comprises receiving the first baseband signal, step 810 may comprise receiving the first baseband signal in any manner generally associated with receiving a baseband signal. The first baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 810 may, for example, comprise generating the first baseband signal independently (e.g., corresponding to an independent communication). Step 810 may alternatively, for example, comprise generating the first baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first baseband signal and other baseband signals for a single communication). The exemplary method 800 may, at step 820, comprise spectrally placing (or shifting) the first baseband signal (e.g., received at step 810). Step 820 may, for example and without limitation, share any or all functional characteristics with the spectral placement modules 110-710 of the exemplary systems 100-700 illustrated in FIGS. 1-7 and discussed previously.

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	Step 820 may, for example, comprise spectrally shifting the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with a second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, step 820 may comprise implementing a frequency-hopping scheme with the first baseband signal. For example, in a scenario where there are one or more frequency bands (e.g., a second frequency space) associated with a second baseband signal, step 820 may comprise spectrally shifting the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. In another non-limiting exemplary scenario, spectrally shifting the first baseband signal may result in the production of a spectral image (e.g., frequency content mirrored about a mixing frequency utilized to spectrally shift the first baseband signal). In such a scenario, step 820 may comprise accepting or rejecting the image. In a scenario where an image is rejected, step 820 may comprise rejecting the image in any of a variety of manners. For example and without limitation, step 820 may comprise performing image reject mixing to spectrally shift the first baseband signal. Such image reject mixing generally comprises spectrally shifting a signal and rejecting an image associated with the spectrally shifted signal. Also for example, step 820 may comprise filtering out an unwanted image. The scope of various aspects of the present invention should not be limited by the utilization of image rejection or by any particular manner of performing such image rejection. The exemplary method 800 may, at step 830, comprise generating and/or receiving a second baseband signal corresponding to a second communication protocol (e.g., different from the first communication protocol). Step 830 may, for example and without limitation, share any or all functional characteristics with the second input 102 of the exemplary system 100 illustrated in FIG. 1 and discussed previously.

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	The second baseband signal may, for example, correspond to a second communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 830 comprises receiving the second baseband signal, step 830 may comprise receiving the second baseband signal in any manner generally associated with receiving a baseband signal. The second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 830 may, for example, comprise generating the second baseband signal independently (e.g., corresponding to a communication independent of a communication associated with the first baseband signal). Step 830 may alternatively, for example, comprise generating the second baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the second baseband signal and the first baseband signal for a single communication). *See*, *e.g.*, Rofougaran at 11:53-13:4. Furthermore, this claim element is obvious in light of Rofougaran itself, when combined with any of the other references as charted for this claim element in Exs. A-1–A-31, First Supplemental Ex. A-Obviousness Chart, and/or when combined with the knowledge of one of ordinary skill in the art. Motivations to combine may come from the knowledge of the person of ordinary skill themselves, or from the known problems and predictable solutions as embodied in these references. Further motivations to combine references and additional details may be found in the Cover Pleading and First Supplemental Ex. A-Obviousness Chart.
[24.3] a second down-converter circuit having a first input coupled to receive the first up-converted signal, a second input coupled to receive a second demodulation signal having a second RF frequency different	Rofougaran discloses “a second down-converter circuit having a first input coupled to receive the first up-converted signal, a second input coupled to receive a second demodulation signal having a second RF frequency different than the first RF frequency, and an output, wherein the second down-converter outputs a second down-converted signal on the second down-converter output, wherein the first up-converted signal comprises a first signal modulated at the first RF frequency and a second signal modulated at the second RF frequency.” See, e.g.:

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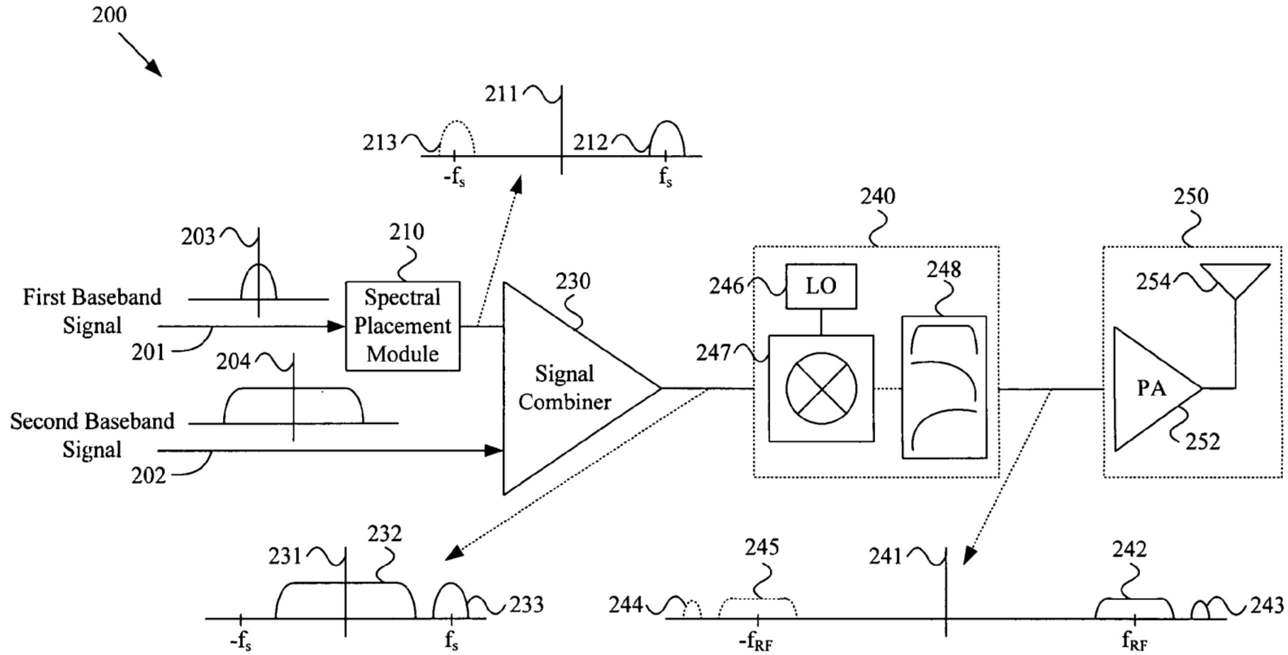
than the first RF frequency, and an output, wherein the second down-converter outputs a second down-converted signal on the second down-converter output, wherein the first up-converted signal comprises a first signal modulated at the first RF frequency and a second signal modulated at the second RF frequency; and	 Figure 2 *See, e.g.*, Rofougaran at Figure 2.

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	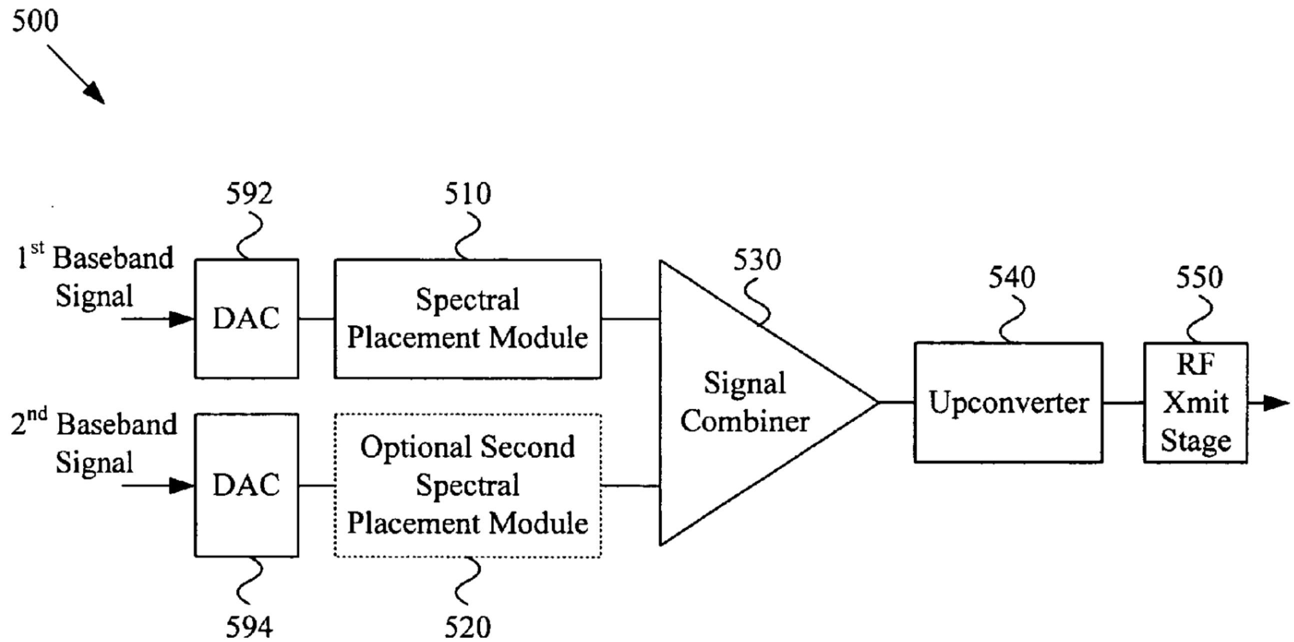 Figure 5 *See, e.g.*, Rofougaran at Figure 5.

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	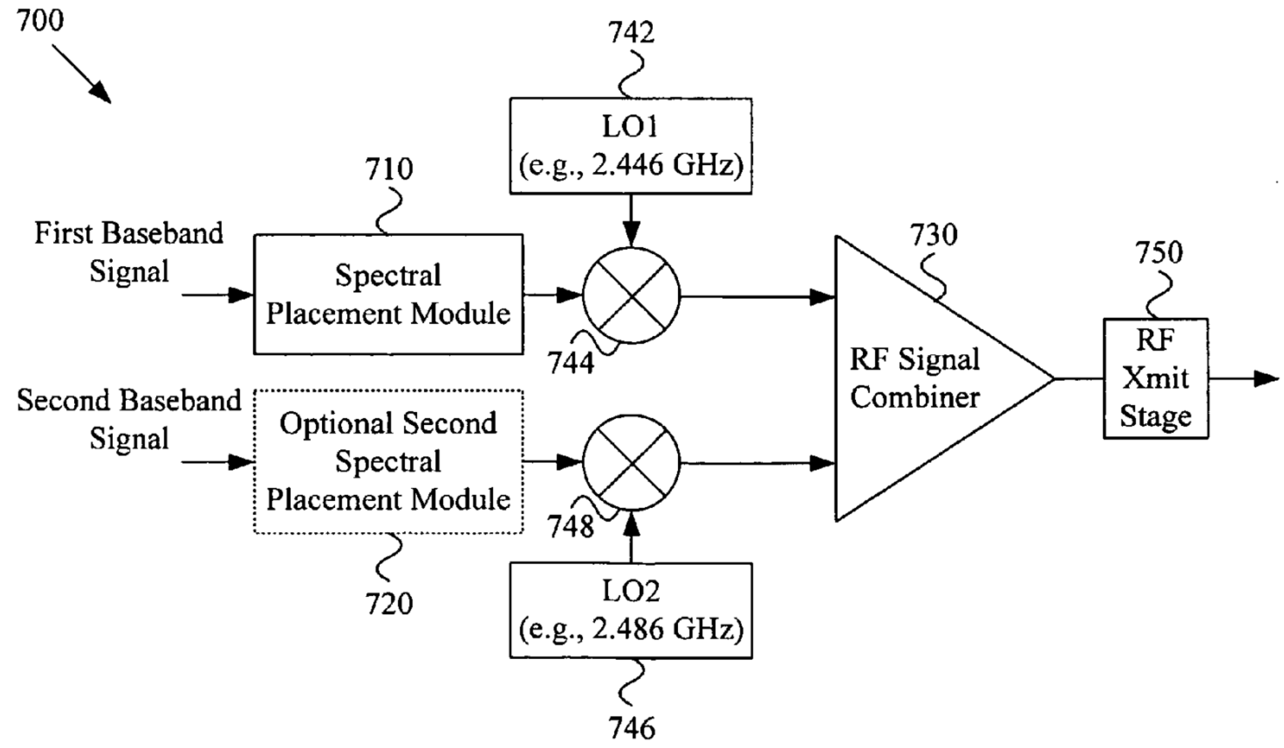 Figure 7 *See, e.g.*, Rofougaran at Figure 7. FIG. 1 is a diagram showing a portion of a first non-limiting exemplary communication system 100, in accordance with various aspects of the present invention. The communication system (or device) may comprise characteristics of any of a variety of communication systems/devices (e.g., multimode wireless communication devices). For example and without limitation, the communication system may comprise characteristics of any of a variety of mobile wireless communication devices (e.g.,

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	cellular phones, paging devices, portable email devices, etc.). Also for example, the communication system may comprise characteristics of fixed communication systems or devices (e.g., network access points, base stations, satellites, wireless routers, set top boxes, etc.). Further for example, the communication system may comprise characteristics of a variety of electronic devices with wireless communication capability (e.g., televisions, music players, cameras, remote controls, personal digital assistants, handheld computers, gaming devices, etc.). Accordingly, the scope of various aspects of the present invention should not be limited by characteristics of particular communication systems or devices. The following discussion will, at times, refer to various communication modes. A multimode communication device may, for example, be adapted to communicate in a plurality of such communication modes. For the following discussion, a communication mode may generally be considered to coincide with communication utilizing a particular communication protocol or standard. A non-limiting list of exemplary communication protocols includes various cellular communication protocols (e.g., GSM, GPRS, EDGE, CDMA, WCDMA, TDMA, PDC, etc.), various wireless networking protocols or standards, including WLAN, WMAN, WPAN and WWAN (e.g., IEEE 802.11, Bluetooth, IEEE 802.15, UWB, IEEE 802.16, IEEE 802.20, Zigbee, any WiFi protocol, etc.), various television communication standards, etc. The scope of various aspects of the present invention should not be limited by characteristics of particular communication modes or protocols, whether standard or proprietary. The exemplary communication system 100 may comprise at least a first input 101 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to any of the previously mentioned communication protocols. The exemplary communication system 100 may also comprise at least a second input 102 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first

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	communication protocol discussed above). For example and without limitation, the second baseband signal may correspond to any of the previously mentioned communication protocols. The first baseband signal and the second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of the communication system 100. For example, such modules may generate the first and second baseband signals independently (e.g., corresponding to independent respective communications). Alternatively, for example, such modules may generate the first and second baseband signals in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first and second baseband signals for a single communication). The exemplary communication system 100 may additionally comprise a spectral placement module 110 that is adapted to spectrally shift the first baseband signal (i.e., shift the frequency spectrum of the first baseband signal). In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to spectrally shift the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with the second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to implement a frequency-hopping scheme with the first baseband signal. For example, in a scenario, where there are one or more frequency bands (e.g., a second frequency space) associated with the second baseband signal, the spectral placement module 110 may be adapted to shift the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. *See, e.g.*, Rofougaran at 2:38-3:58. The exemplary communication system 100 may also comprise a second spectral placement module 120. Such a second spectral placement module 120 may, for example, share any or all characteristics

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	with the spectral placement module 110 discussed previously. The incorporation of such a second spectral placement module 120 may, for example, provide spectral shifting flexibility. For example, in such an exemplary configuration, either or both of the first and second baseband signals may be spectrally shifted to substantially distinct frequency spaces. Also for example, in such an exemplary configuration, either or both of the first and second baseband signals may be frequency hopped. Note that though the second spectral placement module 120 is illustrated separate from the first spectral placement module 110, the second spectral placement module 120 may share any or all hardware and/or software components with the spectral placement module 110. The exemplary communication system 100 may further comprise a signal combiner 130 that is adapted to generate a composite signal comprising various input signals to the signal combiner 130. For example, the composite signal may simultaneously (i.e., at an instant in time) comprise components associated with various input signals. Note that such simultaneity need not always be present. For example, at a first instant in time, the signal output from the signal combiner 130 might comprise a plurality of components associated with a plurality of respective input signals, at a second instant in time, the signal output from the signal combiner 130 might comprise a single component associated with a single respective input signal, and at a third instant in time, the signal output from the signal combiner 130 might comprise no components. In a first non-limiting exemplary scenario, the signal combiner 130 may receive a first signal that is based on the first baseband signal (e.g., associated with a first communication protocol). Also, the signal combiner 130 may receive a second signal that is based on the second baseband signal (e.g., associated with a second communication protocol). In such a scenario, the signal combiner 130 may combine the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the first baseband signal and a second signal component based on the second baseband signal. In such a scenario, for example where the frequency spectra of the first and second baseband signals do not overlap, the first and second baseband signals might not be spectrally shifted prior to combining by the signal combiner 130. In such a scenario, the spectral placement module 110 (and optionally, the second spectral placement module 120) may receive a control signal indicating whether or not to perform spectral shifting and/or to what degree spectral shifting should be implemented.

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	See, e.g., Rofougaran at 4:16-67. Various components of the exemplary communication system 100 (and other communication systems illustrated and discussed herein) may be implemented in analog and/or digital circuitry. To illustrate this, the exemplary communication system 100 is not shown with analog-to-digital converters (ADCs) or digital-to-analog converters (DACs). FIGS. 4-6, to be discussed later, show various non-limiting exemplary configurations including such converters. FIG. 2 is a diagram showing a portion of a second non-limiting exemplary communication system 200, in accordance with various aspects of the present invention. The communication system 200 may, for example and without limitation, share any or all characteristics with the communication system 100 illustrated in FIG. 1 and discussed previously. The exemplary communication system 200 may comprise at least a first input 201 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to the Bluetooth communication protocol. FIG. 2 shows an exemplary frequency spectrum 203 associated with the first baseband signal. The exemplary communication system 200 may also comprise at least a second input 202 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first communication protocol discussed above). For example and without limitation, the first baseband signal may correspond to an IEEE 802.11 communication protocol (e.g., IEEE 802.11(b) or IEEE 802.11(g)). FIG. 2 shows an exemplary frequency spectrum 204 associated with the second baseband signal. *See, e.g.*, Rofougaran at 5:64-6:31.

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	In a non-limiting exemplary configuration illustrated in FIG. 2, the signal combiner 230 receives a first signal from the spectral placement module 210 that is based on the spectrally shifted first baseband signal. Also, the signal combiner 230 receives a second signal that is based on the second baseband signal. In such a configuration, the signal combiner 230 combines the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the spectrally shifted first baseband signal and a second signal component based on the second baseband signal (e.g., not spectrally shifted). FIG. 2 shows an exemplary frequency spectrum 231 associated with the composite signal formed by the signal combiner 230. The spectrum 231 comprises a first portion 233 corresponding to the first signal component, and a second portion 232 corresponding to the second signal component. Note that the first portion 233 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 232. The exemplary communication system 200 may also comprise an upconverter 240 adapted to upconvert a signal (e.g., the composite signal from the signal combiner 230) for transmission. The upconverter 240 may, for example and without limitation, share any or all characteristics with the upconverter 140 discussed previously. The upconverter 240 may, for example, comprise a mixer 247, a local oscillator 246 and one or more filters 248. The mixer 247 may, for example, receive the composite signal from the signal combiner 230 and an RF mixing signal at frequency fRF from a local oscillator 246. The upconverter 240 may, for example, filter the upconverted signal from the mixer 247 with one or more filters 248. The output of the upconverter 240 may, for example, comprise a signal indicative of the composite signal spectrally shifted to an RF frequency. FIG. 2 shows an exemplary frequency spectrum 241 associated with the RF signal formed by the upconverter 240. The frequency spectrum 241 comprises a first portion 243 corresponding to the first signal component and a second portion 242 corresponding to the second signal component. Note that the first portion 243 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 242. Also note that the first portion 243 and

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	second portion 242 might be formed with a first mirror portion 244 and second mirror portion 245, respectively. Note that a mirror portion may either be removed or may be kept for later processing. The exemplary communication system 200 may further comprise a RF transmission stage 250 adapted to transmit an RF signal. The RF transmission stage 250 may, for example and without limitation, share any or all characteristics with the RF transmission stage 150 discussed previously. Such an RF signal may, for example, be associated with the composite signal output from the signal combiner 230 and upconverted by the upconverter 240. The RF transmission stage 250 may, for example and without limitation, comprise a power amplifier 252, antenna 254 and other components generally associated with RF signal transmission. *See, e.g.*, Rofougaran at 6:66-7:57. For example, the spectral placement module 510, optional second spectral placement module 520 and signal combiner 530 may operate in the analog domain. The first digital-to-analog converter 592 may convert the first baseband signal to the analog domain for processing by the spectral placement module 510. The second digital-to-analog converter 594 may convert the second baseband signal to the analog domain for processing by the second spectral placement module 520 or signal combiner 530. The signal combiner 530 then combines signals in the analog domain to generate an analog composite signal, which is then upconverted and transmitted by the upconverter 540 and RF transmission stage 550, respectively. *See, e.g.*, Rofougaran at 9:30-41. FIG. 7 is a diagram showing a portion of a seventh non-limiting exemplary communication system 700, in accordance with various aspects of the present invention. The exemplary communication system 700 may, for example and without limitation, share any or all characteristics with the exemplary systems 100-600 illustrated in FIGS. 1-6 and discussed previously. The exemplary communication system 700 may comprise a first mixer 744 that receives a spectrally shifted first baseband signal from the spectral placement module 710 and a first RF mixing signal (e.g., a 2.446 GHz signal generally associated with the Bluetooth communication protocol) from a

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	first local oscillator 742. The exemplary communication system 700 may also comprise a second mixer 748 that receives a second baseband signal (or a spectrally shifted second baseband signal) and a second RF mixing signal (e.g., a 2.486 GHz signal generally associated with the IEEE 802.11(g) communication protocol) from a second local oscillator 746. The exemplary communication system 700 may comprise an RF signal combiner 730 that is adapted to combine input RF signals. The RF signal combiner 730 may, for example, receive and combine the output signals from the first mixer 744 and second mixer 748 to generate an RF composite signal. The exemplary communication system 700 may also comprise a RF transmission stage 750 that receives the RF composite signal from the RF signal combiner 730 and transmit the signal. *See*, *e.g.*, Rofougaran at 10:18-43. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 810 comprises receiving the first baseband signal, step 810 may comprise receiving the first baseband signal in any manner generally associated with receiving a baseband signal. The first baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 810 may, for example, comprise generating the first baseband signal independently (e.g., corresponding to an independent communication). Step 810 may alternatively, for example, comprise generating the first baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first baseband signal and other baseband signals for a single communication). The exemplary method 800 may, at step 820, comprise spectrally placing (or shifting) the first baseband signal (e.g., received at step 810). Step 820 may, for example and without limitation, share any or all functional characteristics with the spectral placement modules 110-710 of the exemplary systems 100-700 illustrated in FIGS. 1-7 and discussed previously.

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	Step 820 may, for example, comprise spectrally shifting the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with a second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, step 820 may comprise implementing a frequency-hopping scheme with the first baseband signal. For example, in a scenario where there are one or more frequency bands (e.g., a second frequency space) associated with a second baseband signal, step 820 may comprise spectrally shifting the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. In another non-limiting exemplary scenario, spectrally shifting the first baseband signal may result in the production of a spectral image (e.g., frequency content mirrored about a mixing frequency utilized to spectrally shift the first baseband signal). In such a scenario, step 820 may comprise accepting or rejecting the image. In a scenario where an image is rejected, step 820 may comprise rejecting the image in any of a variety of manners. For example and without limitation, step 820 may comprise performing image reject mixing to spectrally shift the first baseband signal. Such image reject mixing generally comprises spectrally shifting a signal and rejecting an image associated with the spectrally shifted signal. Also for example, step 820 may comprise filtering out an unwanted image. The scope of various aspects of the present invention should not be limited by the utilization of image rejection or by any particular manner of performing such image rejection. The exemplary method 800 may, at step 830, comprise generating and/or receiving a second baseband signal corresponding to a second communication protocol (e.g., different from the first communication protocol). Step 830 may, for example and without limitation, share any or all functional characteristics with the second input 102 of the exemplary system 100 illustrated in FIG. 1 and discussed previously.

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	The second baseband signal may, for example, correspond to a second communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 830 comprises receiving the second baseband signal, step 830 may comprise receiving the second baseband signal in any manner generally associated with receiving a baseband signal. The second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 830 may, for example, comprise generating the second baseband signal independently (e.g., corresponding to a communication independent of a communication associated with the first baseband signal). Step 830 may alternatively, for example, comprise generating the second baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the second baseband signal and the first baseband signal for a single communication). *See*, *e.g.*, Rofougaran at 11:53-13:4. Furthermore, this claim element is obvious in light of Rofougaran itself, when combined with any of the other references as charted for this claim element in Exs. A-1–A-31, First Supplemental Ex. A-Obviousness Chart, and/or when combined with the knowledge of one of ordinary skill in the art. Motivations to combine may come from the knowledge of the person of ordinary skill themselves, or from the known problems and predictable solutions as embodied in these references. Further motivations to combine references and additional details may be found in the Cover Pleading and First Supplemental Ex. A-Obviousness Chart.
[24.4] a filter having an input coupled to the output of the first down-converter and the output of the second down-converter, and in accordance therewith, the filter receives the first and second down-converted signals.	Rofougaran discloses "a filter having an input coupled to the output of the first down-converter and the output of the second down-converter, and in accordance therewith, the filter receives the first and second down-converted signals." See, e.g.:

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	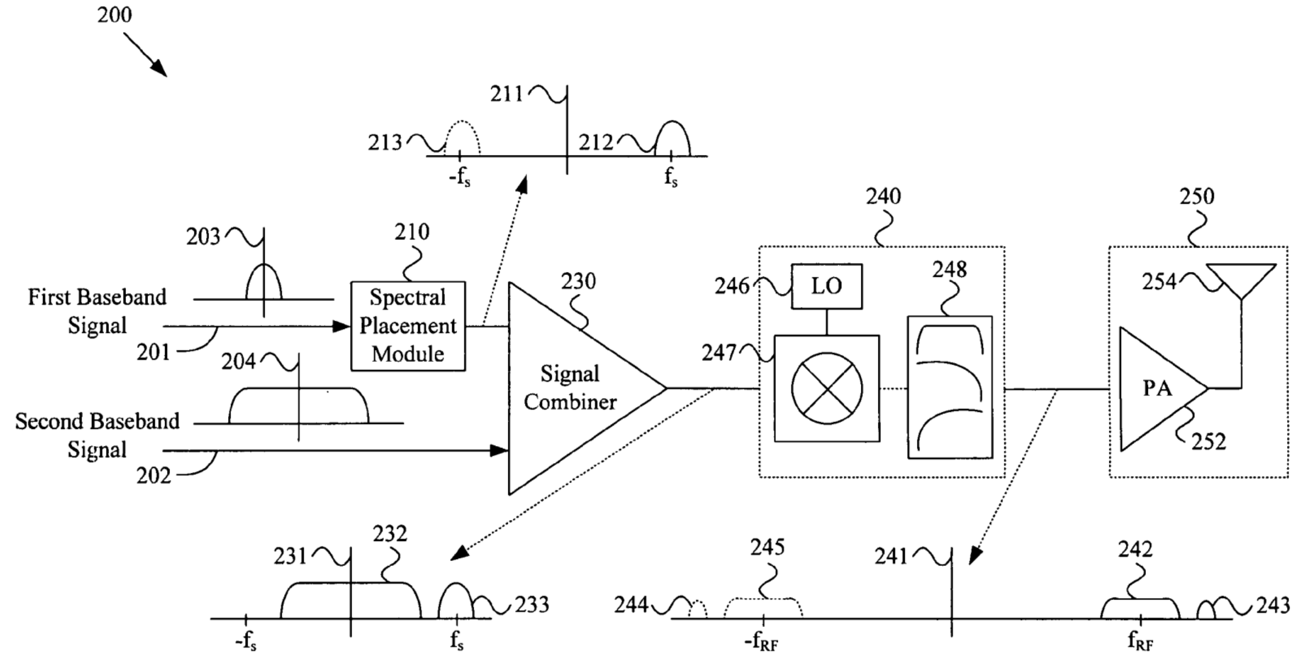 Figure 2 *See, e.g.*, Rofougaran at Figure 2.

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	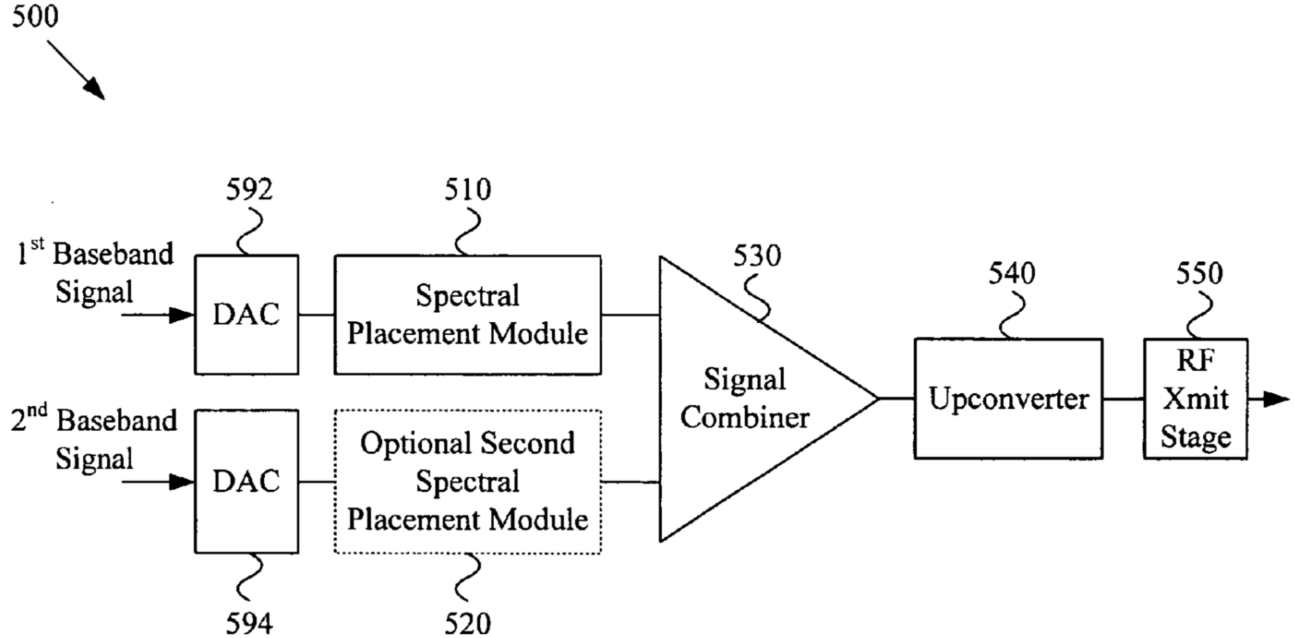 Figure 5 *See, e.g.*, Rofougaran at Figure 5.

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	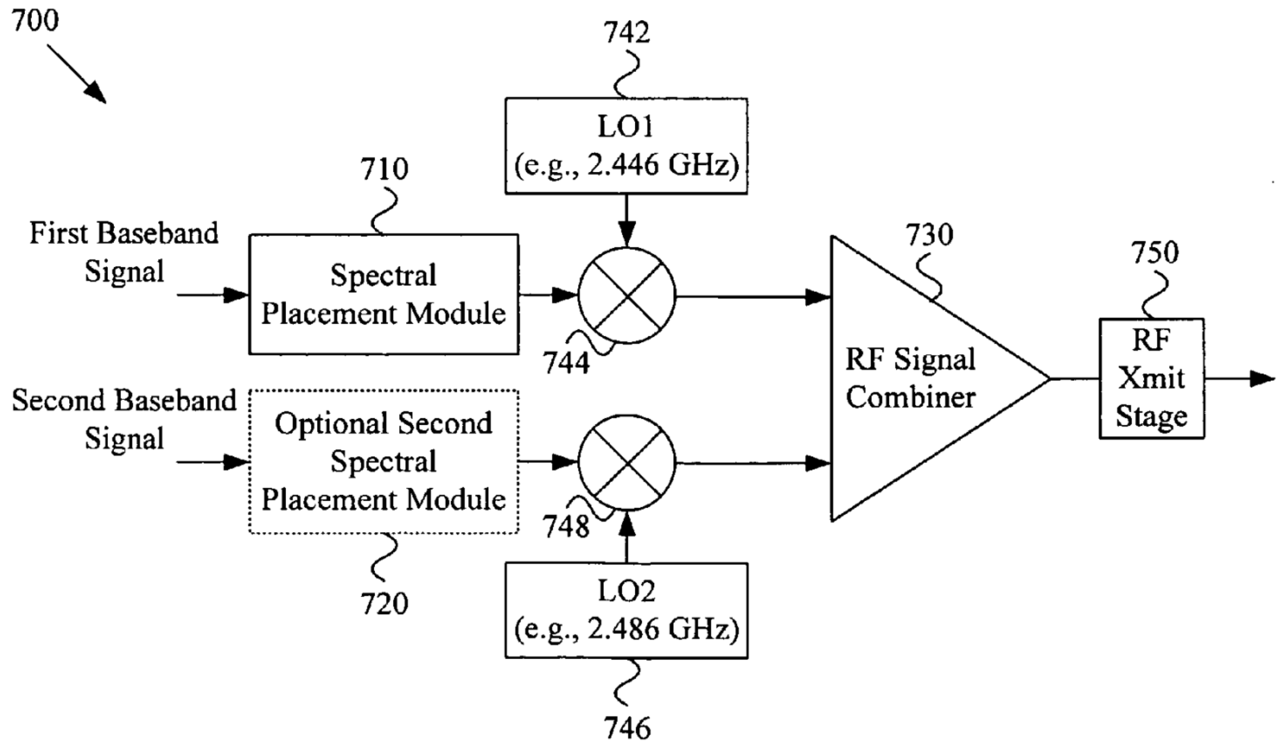 Figure 7 *See, e.g.*, Rofougaran at Figure 7. FIG. 1 is a diagram showing a portion of a first non-limiting exemplary communication system 100, in accordance with various aspects of the present invention. The communication system (or device) may comprise characteristics of any of a variety of communication systems/devices (e.g., multimode wireless communication devices). For example and without limitation, the communication system may comprise characteristics of any of a variety of mobile wireless communication devices (e.g.,

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	cellular phones, paging devices, portable email devices, etc.). Also for example, the communication system may comprise characteristics of fixed communication systems or devices (e.g., network access points, base stations, satellites, wireless routers, set top boxes, etc.). Further for example, the communication system may comprise characteristics of a variety of electronic devices with wireless communication capability (e.g., televisions, music players, cameras, remote controls, personal digital assistants, handheld computers, gaming devices, etc.). Accordingly, the scope of various aspects of the present invention should not be limited by characteristics of particular communication systems or devices. The following discussion will, at times, refer to various communication modes. A multimode communication device may, for example, be adapted to communicate in a plurality of such communication modes. For the following discussion, a communication mode may generally be considered to coincide with communication utilizing a particular communication protocol or standard. A non-limiting list of exemplary communication protocols includes various cellular communication protocols (e.g., GSM, GPRS, EDGE, CDMA, WCDMA, TDMA, PDC, etc.), various wireless networking protocols or standards, including WLAN, WMAN, WPAN and WWAN (e.g., IEEE 802.11, Bluetooth, IEEE 802.15, UWB, IEEE 802.16, IEEE 802.20, Zigbee, any WiFi protocol, etc.), various television communication standards, etc. The scope of various aspects of the present invention should not be limited by characteristics of particular communication modes or protocols, whether standard or proprietary. The exemplary communication system 100 may comprise at least a first input 101 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to any of the previously mentioned communication protocols. The exemplary communication system 100 may also comprise at least a second input 102 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first

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	communication protocol discussed above). For example and without limitation, the second baseband signal may correspond to any of the previously mentioned communication protocols. The first baseband signal and the second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of the communication system 100. For example, such modules may generate the first and second baseband signals independently (e.g., corresponding to independent respective communications). Alternatively, for example, such modules may generate the first and second baseband signals in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first and second baseband signals for a single communication). The exemplary communication system 100 may additionally comprise a spectral placement module 110 that is adapted to spectrally shift the first baseband signal (i.e., shift the frequency spectrum of the first baseband signal). In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to spectrally shift the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with the second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, the spectral placement module 110 may be adapted to implement a frequency-hopping scheme with the first baseband signal. For example, in a scenario, where there are one or more frequency bands (e.g., a second frequency space) associated with the second baseband signal, the spectral placement module 110 may be adapted to shift the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. *See, e.g.*, Rofougaran at 2:38-3:58. The exemplary communication system 100 may also comprise a second spectral placement module 120. Such a second spectral placement module 120 may, for example, share any or all characteristics

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	with the spectral placement module 110 discussed previously. The incorporation of such a second spectral placement module 120 may, for example, provide spectral shifting flexibility. For example, in such an exemplary configuration, either or both of the first and second baseband signals may be spectrally shifted to substantially distinct frequency spaces. Also for example, in such an exemplary configuration, either or both of the first and second baseband signals may be frequency hopped. Note that though the second spectral placement module 120 is illustrated separate from the first spectral placement module 110, the second spectral placement module 120 may share any or all hardware and/or software components with the spectral placement module 110. The exemplary communication system 100 may further comprise a signal combiner 130 that is adapted to generate a composite signal comprising various input signals to the signal combiner 130. For example, the composite signal may simultaneously (i.e., at an instant in time) comprise components associated with various input signals. Note that such simultaneity need not always be present. For example, at a first instant in time, the signal output from the signal combiner 130 might comprise a plurality of components associated with a plurality of respective input signals, at a second instant in time, the signal output from the signal combiner 130 might comprise a single component associated with a single respective input signal, and at a third instant in time, the signal output from the signal combiner 130 might comprise no components. In a first non-limiting exemplary scenario, the signal combiner 130 may receive a first signal that is based on the first baseband signal (e.g., associated with a first communication protocol). Also, the signal combiner 130 may receive a second signal that is based on the second baseband signal (e.g., associated with a second communication protocol). In such a scenario, the signal combiner 130 may combine the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the first baseband signal and a second signal component based on the second baseband signal. In such a scenario, for example where the frequency spectra of the first and second baseband signals do not overlap, the first and second baseband signals might not be spectrally shifted prior to combining by the signal combiner 130. In such a scenario, the spectral placement module 110 (and optionally, the second spectral placement module 120) may receive a control signal indicating whether or not to perform spectral shifting and/or to what degree spectral shifting should be implemented.

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	See, e.g., Rofougaran at 4:16-67. Various components of the exemplary communication system 100 (and other communication systems illustrated and discussed herein) may be implemented in analog and/or digital circuitry. To illustrate this, the exemplary communication system 100 is not shown with analog-to-digital converters (ADCs) or digital-to-analog converters (DACs). FIGS. 4-6, to be discussed later, show various non-limiting exemplary configurations including such converters. FIG. 2 is a diagram showing a portion of a second non-limiting exemplary communication system 200, in accordance with various aspects of the present invention. The communication system 200 may, for example and without limitation, share any or all characteristics with the communication system 100 illustrated in FIG. 1 and discussed previously. The exemplary communication system 200 may comprise at least a first input 201 adapted to receive a first baseband signal. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). For example and without limitation, the first baseband signal may correspond to the Bluetooth communication protocol. FIG. 2 shows an exemplary frequency spectrum 203 associated with the first baseband signal. The exemplary communication system 200 may also comprise at least a second input 202 adapted to receive a second baseband signal. The second baseband signal may, for example, correspond to a second communication protocol (e.g., a second communication protocol different from the first communication protocol discussed above). For example and without limitation, the first baseband signal may correspond to an IEEE 802.11 communication protocol (e.g., IEEE 802.11(b) or IEEE 802.11(g)). FIG. 2 shows an exemplary frequency spectrum 204 associated with the second baseband signal. *See, e.g.*, Rofougaran at 5:64-6:31.

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	In a non-limiting exemplary configuration illustrated in FIG. 2, the signal combiner 230 receives a first signal from the spectral placement module 210 that is based on the spectrally shifted first baseband signal. Also, the signal combiner 230 receives a second signal that is based on the second baseband signal. In such a configuration, the signal combiner 230 combines the first and second signals to generate a composite signal, where the composite signal simultaneously comprises a first signal component based on the spectrally shifted first baseband signal and a second signal component based on the second baseband signal (e.g., not spectrally shifted). FIG. 2 shows an exemplary frequency spectrum 231 associated with the composite signal formed by the signal combiner 230. The spectrum 231 comprises a first portion 233 corresponding to the first signal component, and a second portion 232 corresponding to the second signal component. Note that the first portion 233 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 232. The exemplary communication system 200 may also comprise an upconverter 240 adapted to upconvert a signal (e.g., the composite signal from the signal combiner 230) for transmission. The upconverter 240 may, for example and without limitation, share any or all characteristics with the upconverter 140 discussed previously. The upconverter 240 may, for example, comprise a mixer 247, a local oscillator 246 and one or more filters 248. The mixer 247 may, for example, receive the composite signal from the signal combiner 230 and an RF mixing signal at frequency fRF from a local oscillator 246. The upconverter 240 may, for example, filter the upconverted signal from the mixer 247 with one or more filters 248. The output of the upconverter 240 may, for example, comprise a signal indicative of the composite signal spectrally shifted to an RF frequency. FIG. 2 shows an exemplary frequency spectrum 241 associated with the RF signal formed by the upconverter 240. The frequency spectrum 241 comprises a first portion 243 corresponding to the first signal component and a second portion 242 corresponding to the second signal component. Note that the first portion 243 occupies a frequency space (e.g., one or more frequency bands) that is distinct from the frequency space occupied by the second portion 242. Also note that the first portion 243 and

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	second portion 242 might be formed with a first mirror portion 244 and second mirror portion 245, respectively. Note that a mirror portion may either be removed or may be kept for later processing. The exemplary communication system 200 may further comprise a RF transmission stage 250 adapted to transmit an RF signal. The RF transmission stage 250 may, for example and without limitation, share any or all characteristics with the RF transmission stage 150 discussed previously. Such an RF signal may, for example, be associated with the composite signal output from the signal combiner 230 and upconverted by the upconverter 240. The RF transmission stage 250 may, for example and without limitation, comprise a power amplifier 252, antenna 254 and other components generally associated with RF signal transmission. *See, e.g.*, Rofougaran at 6:66-7:57. For example, the spectral placement module 510, optional second spectral placement module 520 and signal combiner 530 may operate in the analog domain. The first digital-to-analog converter 592 may convert the first baseband signal to the analog domain for processing by the spectral placement module 510. The second digital-to-analog converter 594 may convert the second baseband signal to the analog domain for processing by the second spectral placement module 520 or signal combiner 530. The signal combiner 530 then combines signals in the analog domain to generate an analog composite signal, which is then upconverted and transmitted by the upconverter 540 and RF transmission stage 550, respectively. *See, e.g.*, Rofougaran at 9:30-41. FIG. 7 is a diagram showing a portion of a seventh non-limiting exemplary communication system 700, in accordance with various aspects of the present invention. The exemplary communication system 700 may, for example and without limitation, share any or all characteristics with the exemplary systems 100-600 illustrated in FIGS. 1-6 and discussed previously. The exemplary communication system 700 may comprise a first mixer 744 that receives a spectrally shifted first baseband signal from the spectral placement module 710 and a first RF mixing signal (e.g., a 2.446 GHz signal generally associated with the Bluetooth communication protocol) from a

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	first local oscillator 742. The exemplary communication system 700 may also comprise a second mixer 748 that receives a second baseband signal (or a spectrally shifted second baseband signal) and a second RF mixing signal (e.g., a 2.486 GHz signal generally associated with the IEEE 802.11(g) communication protocol) from a second local oscillator 746. The exemplary communication system 700 may comprise an RF signal combiner 730 that is adapted to combine input RF signals. The RF signal combiner 730 may, for example, receive and combine the output signals from the first mixer 744 and second mixer 748 to generate an RF composite signal. The exemplary communication system 700 may also comprise a RF transmission stage 750 that receives the RF composite signal from the RF signal combiner 730 and transmit the signal. *See, e.g.*, Rofougaran at 10:18-43. The first baseband signal may, for example, correspond to a first communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 810 comprises receiving the first baseband signal, step 810 may comprise receiving the first baseband signal in any manner generally associated with receiving a baseband signal. The first baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 810 may, for example, comprise generating the first baseband signal independently (e.g., corresponding to an independent communication). Step 810 may alternatively, for example, comprise generating the first baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the first baseband signal and other baseband signals for a single communication). The exemplary method 800 may, at step 820, comprise spectrally placing (or shifting) the first baseband signal (e.g., received at step 810). Step 820 may, for example and without limitation, share any or all functional characteristics with the spectral placement modules 110-710 of the exemplary systems 100-700 illustrated in FIGS. 1-7 and discussed previously.

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	Step 820 may, for example, comprise spectrally shifting the first baseband signal by, at least in part, spectrally shifting the first baseband signal to one or more frequency bands that are substantially distinct from one or more frequency bands associated with a second baseband signal. Occupying such substantially distinct frequency bands, the spectrally shifted first baseband signal may, for example, be combined with the second baseband signal for simultaneous transmission with no interference, relatively little interference, or an acceptable level of interference. In a non-limiting exemplary scenario, step 820 may comprise implementing a frequency-hopping scheme with the first baseband signal. For example, in a scenario where there are one or more frequency bands (e.g., a second frequency space) associated with a second baseband signal, step 820 may comprise spectrally shifting the first baseband signal to numerous consecutive frequency spaces (or bands) that are substantially distinct from the second frequency space. In another non-limiting exemplary scenario, spectrally shifting the first baseband signal may result in the production of a spectral image (e.g., frequency content mirrored about a mixing frequency utilized to spectrally shift the first baseband signal). In such a scenario, step 820 may comprise accepting or rejecting the image. In a scenario where an image is rejected, step 820 may comprise rejecting the image in any of a variety of manners. For example and without limitation, step 820 may comprise performing image reject mixing to spectrally shift the first baseband signal. Such image reject mixing generally comprises spectrally shifting a signal and rejecting an image associated with the spectrally shifted signal. Also for example, step 820 may comprise filtering out an unwanted image. The scope of various aspects of the present invention should not be limited by the utilization of image rejection or by any particular manner of performing such image rejection. The exemplary method 800 may, at step 830, comprise generating and/or receiving a second baseband signal corresponding to a second communication protocol (e.g., different from the first communication protocol). Step 830 may, for example and without limitation, share any or all functional characteristics with the second input 102 of the exemplary system 100 illustrated in FIG. 1 and discussed previously.

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	The second baseband signal may, for example, correspond to a second communication protocol (e.g., any of a variety of wireless communication protocols and/or standards). In an exemplary scenario where step 830 comprises receiving the second baseband signal, step 830 may comprise receiving the second baseband signal in any manner generally associated with receiving a baseband signal. The second baseband signal may, for example, be generated by one or more modules (i.e., hardware and/or software modules) of a communication system implementing the exemplary method 800. Step 830 may, for example, comprise generating the second baseband signal independently (e.g., corresponding to a communication independent of a communication associated with the first baseband signal). Step 830 may alternatively, for example, comprise generating the second baseband signal in a dependent manner (e.g., coordinating independent respective communications or utilizing both the second baseband signal and the first baseband signal for a single communication). *See*, *e.g.*, Rofougaran at 11:53-13:4. Furthermore, this claim element is obvious in light of Rofougaran itself, when combined with any of the other references as charted for this claim element in Exs. A-1–A-31, First Supplemental Ex. A-Obviousness Chart, and/or when combined with the knowledge of one of ordinary skill in the art. Motivations to combine may come from the knowledge of the person of ordinary skill themselves, or from the known problems and predictable solutions as embodied in these references. Further motivations to combine references and additional details may be found in the Cover Pleading and First Supplemental Ex. A-Obviousness Chart.